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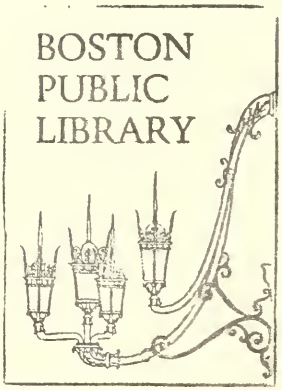
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# New England Medical Center

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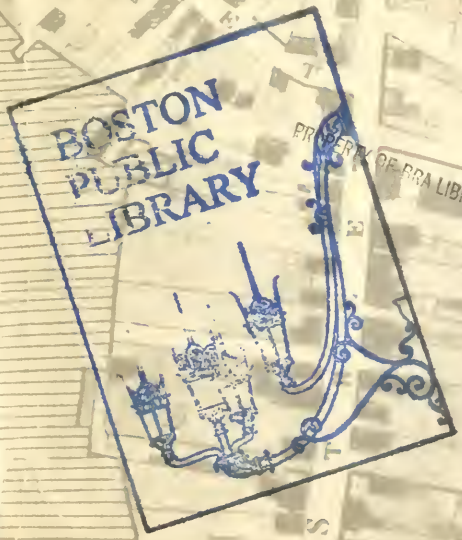


South Cove
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## *In the South Cove*

# MEDICAL CENTER IN THE SOUTH COVE

A Study for the Development of the New England Medical Center and its Neighborhood

Submitted to the Executive Board, New England Medical Center

By Kevin Lynch
Planning Consultant

December 1955

## TWO PROBLEMS

The New England Medical Center is faced with a problem of growth, and its neighborhood, the South Cove, with a problem of decay. Both problems are connected. Not only must the Medical Center understand its neighborhood so that it may find the space it needs for expansion, not only must it help reconstruct it so that its own environment be improved, but indeed as the strongest force in the area, it bears a responsibility for rebuilding that goes across its own property lines. Unhappily or otherwise, it must look beyond internal preoccupations to other issues that surround it.

This report is designed to suggest a general plan, both for the physical growth of the Center, and for the reconstruction of the South Cove. It falls naturally into a section analyzing the total district, another discussing the Center, a third which presents a plan, and a final section outlining the next steps to be taken by the Center. It is preceded by a summary of its conclusions, and accompanied by a series of maps, charts, and diagrams which illustrate its contents. Submitted with this report is the independent study of Prof. Thomas Atwater, market consultant, on the economic re-use possibilities of the area.

### Brief Summary

Condensed to its most general points, the report makes the following findings and proposals:

### The South Cove

1. The South Cove is clearly decadent and substandard; an area of physical dilapidation and progressive abandonment, of mixed and

shifting use, of declining values, declining population, low incomes, low rents, and poor health. It is socially better organized than might be expected, due largely to the strength of the Chinese and Syrian family and community. No new growth has occurred for half a century.

2. The two dominant existing interests in the district are the New England Medical Center and the Chinese community, a community isolated, lacking in social or economic opportunity, and housed in an inadequate supply of very bad dwellings. Despite some outward movement, the community is anchored here and has an obvious need for decent housing and adequate recreation in the vicinity.

3. The South Cove has both the disadvantages and the advantages of being close to the heart of the city, with its central shopping, entertainment and transportation. It lies at the weak "hinge" of an extended central district. Along with the blocks just west of Tremont, it is unique as the area ripe for redevelopment which is closest to the urban core. The new expressway will greatly increase its accessibility.

4. If cleared and redeveloped, there are economic re-use possibilities for office buildings and the retail of consumer's hard goods along the northern boundary -- for parking, for "one-stop" retail, and for regional distributors on the eastern edge. The demand would be for little more than small retail shops or light manufacturing on the interior, and this land may be better devoted to other uses.

5. There seems to be no prospect for an automatic, self-generating renewal of this area.

The New England Medical Center:

1. The Medical Center at present occupies 552,000 square feet of floor space sited on 143,000 square feet of net ground area. At present the physical plant is cramped and awkward - the result of piecemeal growth. Despite their varying condition, all the present buildings must continue in use for some time, with the possible exception of the old Boston Dispensary structure and of the New England Medical Center Building.

2. The Center has a long-range need to grow, in order to develop into a full-scale medical center, as well as to meet pressing immediate space needs. Study is needed to clarify the general direction such growth should take. Functional integration between the independent units should continue to increase.

3. At present the Center suffers from a very poor surrounding environment, but, due to the proximity to central Boston, its location could be turned to solid advantage. The site must acquire identifiable form and location, and a good relation to the urban core. Future growth must proceed in a rational coordinated way. There is a present serious need for twice the available car parking space, and this will increase markedly in the future.

4. Following an analysis of the Center as a set of functional groups of facilities, and consideration of the probable growth of these groups, a future total requirement for floor space in 1980 of 1,358,000 square feet is estimated, inclusive of residence but exclusive of parking. This is an increase of approximately 2½ times. Based on an assumption of desirable floor area ratio, the future total requirement for ground space will be 636,000 square feet. Excluding residential uses and present

building sites, the total additional ground needed within the next twenty-five years will be 400,000 square feet.

5. Beyond these quantitative requirements, the new Center must have good access; be easily identifiable; be flexible; have beauty and an easy, intimate scale; and interrelate the necessary functions in a logical way. A theoretical functional pattern is developed, and the three basic possibilities of expansion in the South Cove are examined. The alternative of growth on a linear pattern from Tremont Street to the Expressway, along a central pedestrian spine, is recommended.

A Plan For Growth

1. Alternative techniques for attacking the problem are discussed, and the rebuilding of the area through the redevelopment process is strongly recommended, under the 1954 Housing Act and chapter 121 of the Massachusetts laws, for the benefit of the City of Boston, the New England Medical Center, and the present residents alike.

2. A redevelopment scheme is proposed which allots:

a. 280,000 square feet to intensive commercial uses, in two parcels: the west side of Washington between Dore and Hollis Streets, and the new superblock: Harrison - Oak - Expressway - Boston & Albany tracks.

b. 400,000 additional square feet to the New England Medical Center: a strip from Tremont to the Expressway, and roughly between Hollis and Warrenton Streets, and Harvard and Oak Streets.

c. 320,000 square feet to housing and local services in the two blocks: Harrison - Oak - Shawmut - Boston & Albany tracks.

3. Tremont, Washington and Harrison are retained and improved

as feeder streets. Oak and Harvard Streets are widened and extended to form a new internal loop, and a new collector street is put through on the north side of the railroad cut. Broadway and most of the minor streets would be closed. A new pedestrian subway tunnel from the Boylston station to Bennet Street is proposed, as well as a pedestrian bridge over Harrison Avenue. Three parking garages are provided, and a new loading area opened up behind the loft buildings on Kneeland Street.

4. The treatment of the Medical Center site is shown in an illustrative site plan, and the development of the commercial area is discussed. It is recommended that the housing area be developed for relocated families; for Medical Center staff, students and ambulatory patients; and possibly for the elderly. Space for community facilities and perhaps for special retail uses must be allocated. But more definite plans for this latter area are left for further study. It is recommended that development of the housing area be carried out by a South Cove Housing Corporation, organized as an urban redevelopment corporation under Chapter 121A of the General Laws.

5. The technical feasibility of the plan is discussed, and a tentative estimate of costs is made, on the basis of rough assumptions. The estimate indicates a low net project cost, of which only a small portion need be a cash grant by the city. A net gain in assessed valuation will probably result that will bring in, in additional tax revenue, almost the amount of the total cash grant, within the first year of assessment at full development.

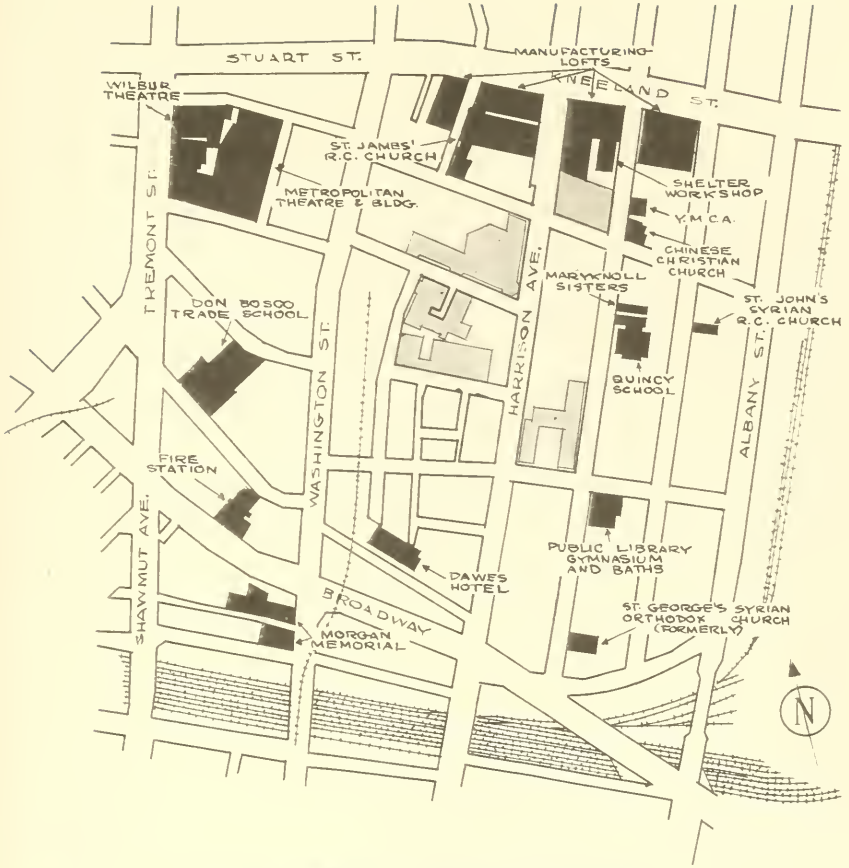
Next Steps

1. The Center is urged to ensure its future growth by employing an integrated system of real estate acquisition, by adopting a master

plan, by engaging the services of a coordinating architect or site planner on a continuing basis, and by strengthening its public relations staff.

2. Cooperative endeavor with local groups in the South Cove is proposed, with the Chinese community in particular. Other interested groups are mentioned, and the ultimate convergence of group action on the organization of the South Cove Housing Corporation is recommended.

3. The Medical Center must now request the City of Boston to declare the South Cove to be an area suitable for redevelopment, and to give its preliminary approval to the project by requesting federal funds for detailed study. Steps leading to this preliminary approval are discussed, as well as the general nature of the redevelopment process, the timing to be expected, and the several particular problems that must be resolved in the detailed studies following on preliminary approval.




## KEY BUILDINGS AND INSTITUTIONS

BUILDINGS OF THE NEW ENGLAND MEDICAL CENTER

OTHER IMPORTANT BUILDINGS OR INSTITUTIONS

SCALE: FEET 0 100 200 300 400 500 600 700 800 900

# NEW ENGLAND MEDICAL CENTER AREA DEVELOPMENT STUDY

KEVIN LYNCH, CONSULTANT

FIGURE 1

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## THE SOUTH COVE

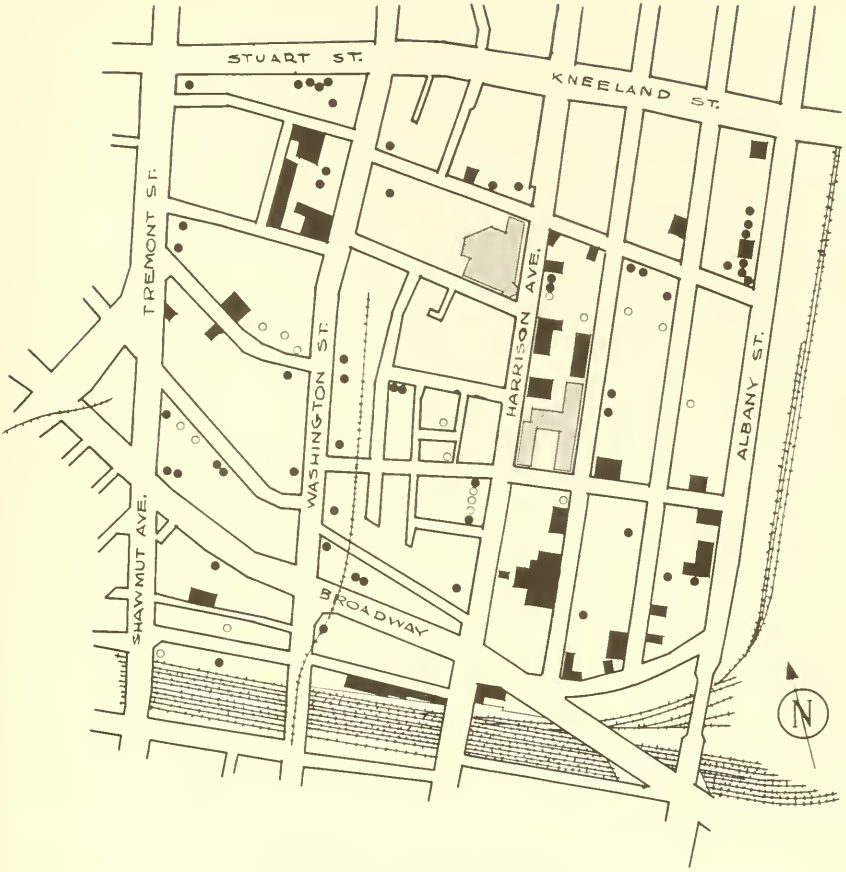
In the South Cove Boston first took up its vast 19th century task of expansion over surrounding tidal flats, and on the very site now occupied by Medical Center buildings. In 1805 Harrison Avenue, then Front Street, was built out in the water, parallel to Washington, and the land filled in behind. The city's first building line regulation was adopted here, the owners agreeing to set their houses back ten feet from the new street line. The tiny front gardens on the west side of Harrison are today's witness to that early planning agreement.

A quarter-century later, in the six years 1833-1839, the South Cove Corporation organized itself, acquired over three million square feet of tidal flat at 12 cents a square foot, and filled in the remainder of the area, past Albany Street into the present railroad yards. This gave the Boston & Worcester R.R. its Boston terminal, while the remaining land west of Albany was subdivided and sold.

Thus in 1840 the South Cove was new land east of the Neck, filling with comfortable houses. Now in the 1950's these houses are quite worn out. In those years they have served as reception center for the immigrant, and his training ground for life in a broader society. The Irish pushed out the original inhabitants, the Syrians succeeded the Irish, and now the Chinese are moving on the heels of the departing Syrians. Along Tyler and Hudson Streets and now on Harrison, the exhausted houses, separated at intervals by parking lots, are being occupied and refurbished again.

### Physical Condition

These parking lots, which mark the sites of demolished




## GROWTH AND DECAY

- BUILDINGS RAZED WITHOUT REPLACEMENT SINCE 1940
- NEW BUILDINGS SINCE 1940
- PRESENT BUILDINGS WITH MAJOR VACANCIES
- PRESENT BUILDINGS RECENTLY REHABILITATED

SCALE: FEET 0 100 200 300 400 500 600 700 800 900

# NEW ENGLAND MEDICAL CENTER AREA DEVELOPMENT STUDY

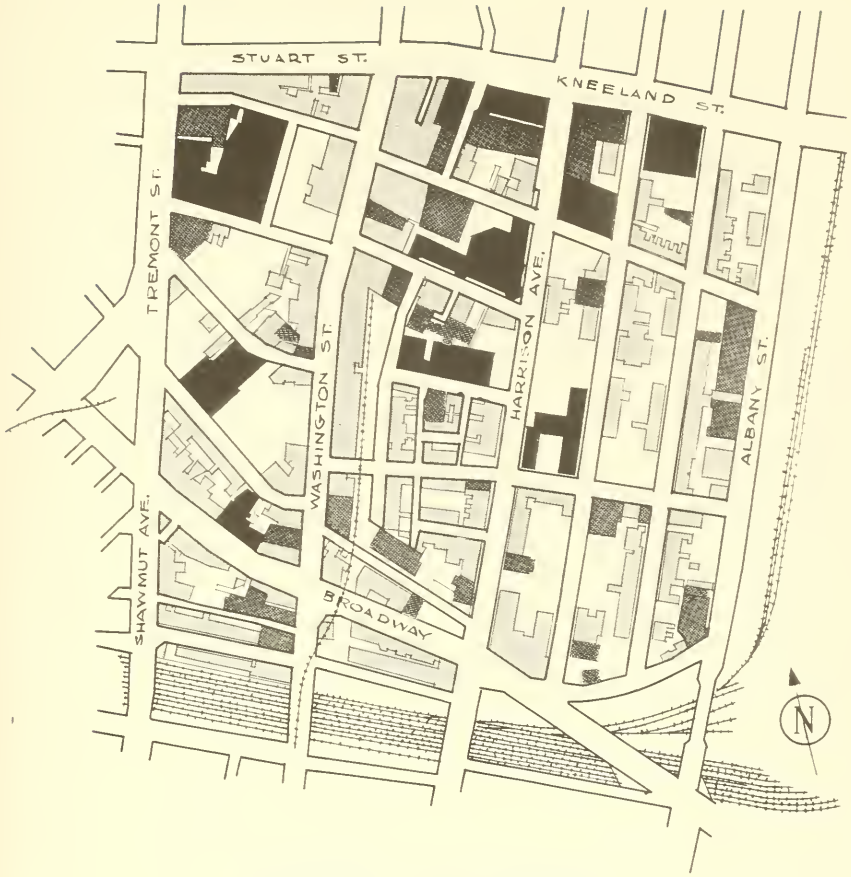
KEVIN LYNCH, CONSULTANT

FIGURE 2

buildings, are an index of what is happening to the physical fabric of the South Cove in its final stages. Fig. 2 shows the physical changes that have been occurring -- essentially since the last war. Substantial, if piecemeal, areas have been razed to the east of Washington, while on that street and the west there is a significant rate of vacancy. One-third of the dwelling units recorded in 1940 had disappeared without replacement by 1950. Of new building there is none, other than the New England Medical Center itself. Only minor reconditioning tends to occur on the fringes of the Center's zone, due to the influence of its new growth and expansion, or to the efforts of the incoming Chinese.

We are dealing here, in this square between Tremont, Kneeland, Albany and the railroad, with a gross area of about 47½ acres. Fig. 3, which is a summary of a more detailed map accompanying this report, illustrates the physical condition of this district. There are substantial multi-story lofts along Kneeland Street, and behind this mountain range are the structures of the Medical Center. Two theatres and the isolated Don Bosco School stand on Tremont Street, while the several sound factory buildings on Albany are soon to go before the new expressway. Beyond this, there are only a few structures in reasonable condition. Of the substandard majority, disadvantaged by age, neglect, internal plan, timber framing, and wooden pile foundations in a falling water table, only a scattering can be worth serious rehabilitation, and are generally too isolated to be worth determined effort.

The land use map, Fig. 4, which is also a condensation of a larger drawing, gives some sense of the heterogeneity of the district, a mixture of institutions, apartments, lodging houses, parking lots,




## CONDITION OF BUILDINGS

IN POOR CONDITION

IN FAIR CONDITION

IN EXCELLENT CONDITION

SOURCE: FIELD SURVEY

SCALE FEET 0 100 200 300 400 500 600 700 800 900

# NEW ENGLAND MEDICAL CENTER AREA DEVELOPMENT STUDY

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FIGURE 3

**EXISTING LAND USE**

- VACANT OR OPEN
- RESIDENTIAL
- INSTITUTIONAL
- COMMERCIAL

SOURCE: FIELD SURVEY

SCALE: FEET 0 100 200 300 400 500 600 700 800 900

# NEW ENGLAND MEDICAL CENTER AREA DEVELOPMENT STUDY

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FIGURE 4

warehouses, factories, and stores. Much of the street frontage is lined with shops and workrooms at the first floor or basement levels -- some of them vacant, many only dimly active. This mixture reflects the long history of the Cove, and the complex life of its residents, but it also points this out as a fringe area, a region of transition and uncertain use.

To generalize, there is a ridge of garment lofts along Kneeland Street, and a small cluster of theatrical uses at the corner of Tremont. Factories predominate on Albany Street, and there is a peppering of lofts, repair shops, equipment dealers and contractors throughout the region. Commercial uses line the first floors of Washington; cheap furniture from Kneeland to Hollis Street, and local service and beer parlors beyond. The furniture district is the only intrusion of central retail use anywhere in the area, beyond the Kneeland Street line.

The lower end of the district, toward Shawmut and the Boston & Albany tracks, is increasingly populated with the drifters who are shifting their habitat from Scollay Square. The section west of Washington is of variable use as well as shattered condition, with many lodging houses. The land east of Washington, however, retains a basic family residential character. In fact, the entire study district is still predominantly a residential one, despite its heterogeneity.

The housing is typified by rows of close-packed three and four family walk-ups built in the 19th century, brick-walled and timber-framed. Not a single new residential building has been built in the South Cove since World War I, and probably long before. 70% are heated by stoves, if heated at all, and 50% are dilapidated or have no private bath, according to the U. S. Census. The physical condition of the

## DWELLING UNITS AND RENT LEVELS

$35.00 TO $45.00

$25.00 TO $35.00

$15.00 TO $25.00

CIRCLED NUMBERS INDICATE NUMBER OF DWELLING UNITS IN EACH BLOCK.

SOURCE: U.S. CENSUS, 1950

SCALE FEET 0 100 200 300 400 500 600 700 800 900

# NEW ENGLAND MEDICAL CENTER AREA DEVELOPMENT STUDY

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FIGURE 5

South Cove cannot be questioned; it is clearly both substandard and decadent, within the meaning of Chapter 121 of the Massachusetts General Laws. Fig. 5 gives the number of dwelling units per block, according to the Census of 1950, and also the average monthly contract rent, which is very low. The median rent is barely $24.00 a month.

Figs. 6 and 7 give further information on the physical condition of the region. The former shows the contours of the ground and the line of the original shore, which divides the flat land and regular street system of the filled ground from the slopes and confused streets of the original Neck. This has a practical as well as historical meaning, since it demarcates two different zones of drainage and foundation condition. The filled ground has 20 to 30 feet of miscellaneous fill and organic silt on top of the 10 to 15-foot layer of stiff yellow clay on which foundations of most buildings may be floated. Below the yellow clay is 40 to 80 feet of soft blue clay, which, for heavy foundations, must be penetrated to reach hard sand or rock. The filled area differs from the original land both in the presence of this top layer of fill and silt, and in the underground action of the tides.

The latter map summarizes the location of the principal mains of the various underground utilities, systems which are separately shown in greater detail on maps accompanying this report. Most significant is the heavy concentration of these mains on Kneeland Street and on the three feeders running out from the city's center: Tremont, Washington, and Harrison. Only occasionally is this pattern departed from, with the most notable exception, perhaps, of the sewer system.

Land Values

Total assessed valuation of the district at present is

## CONTOURS AND ORIGINAL SHORE LINE

DOTTED LINES INDICATE ORIGINAL SHORE LINE
SOLID LINES INDICATE CONTOURS
SHADED AREA INDICATES ORIGINAL LAND AREA
SOURCE: MAP, 1800

SCALE: FEET 0 100 200 300 400 500 600 700 800 900

# NEW ENGLAND MEDICAL CENTER AREA DEVELOPMENT STUDY

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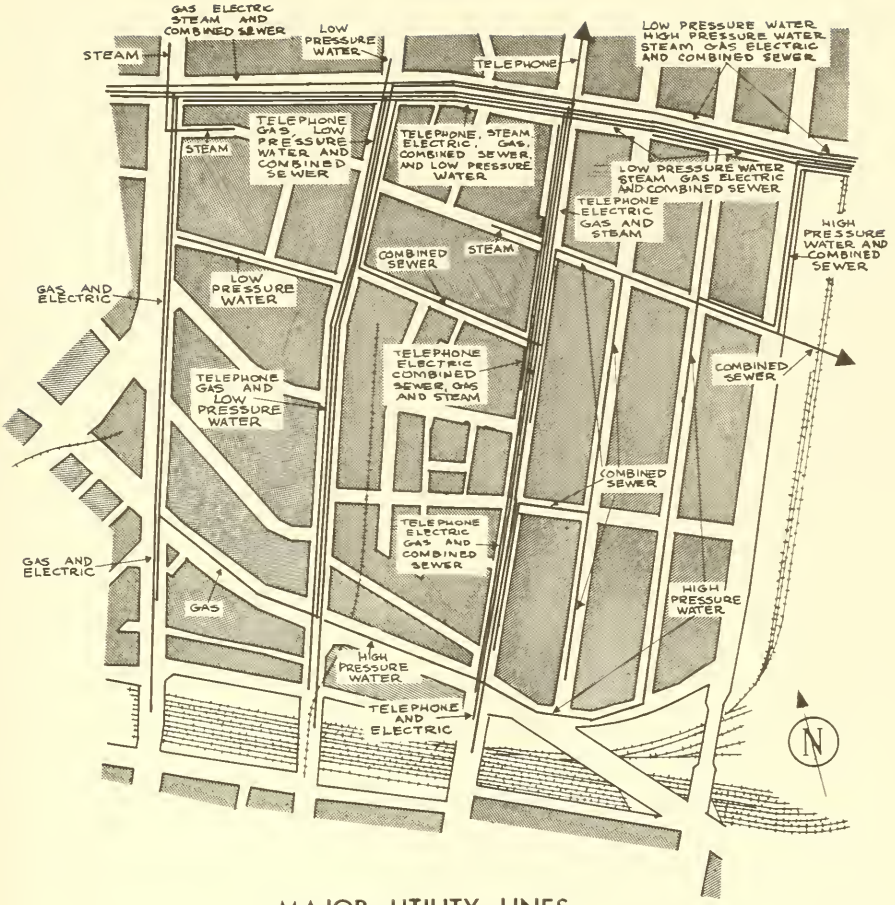
FIGURE 6


GAS ELECTRIC STEAM AND COMBINED SEWER
STEAM
LOW PRESSURE WATER
TELEPHONE
LOW PRESSURE WATER HIGH PRESSURE WATER STEAM GAS ELECTRIC AND COMBINED SEWER
TELEPHONE GAS LOW PRESSURE WATER AND COMBINED SEWER
STEAM
TELEPHONE, STEAM ELECTRIC, GAS, COMBINED SEWER AND LOW PRESSURE WATER
LOW PRESSURE WATER STEAM GAS ELECTRIC AND COMBINED SEWER
TELEPHONE ELECTRIC GAS AND STEAM
HIGH PRESSURE WATER AND COMBINED SEWER
COMBINED SEWER
STEAM
GAS AND ELECTRIC
LOW PRESSURE WATER
TELEPHONE ELECTRIC COMBINED SEWER, GAS AND STEAM
COMBINED SEWER
TELEPHONE GAS AND LOW PRESSURE WATER
COMBINED SEWER
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GAS AND ELECTRIC
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## MAJOR UTILITY LINES

SOURCE: PUBLIC UTILITY AGENCIES

SCALE: FEET 0 100 200 300 400 500 600 700 800 900

# NEW ENGLAND MEDICAL CENTER AREA DEVELOPMENT STUDY

KEVIN LYNCH, CONSULTANT

FIGURE 7

$17,155,250, divided as follows, in round figures:

| | Land | Buildings | Land & Buildings |
|---|---|---|---|
| Taxable property | 6,130,000 | 5,780,000 | 11,910,000 |
| Tax-exempt property | 1,040,000 | 4,210,000 | 5,250,000 |
| Totals | 7,170,000 | 9,990,000 | 17,160,000 |

The low ratio of building to land value in the taxable property is evident, a ready index of improper development and of a ripeness for change. Total values in the area have shown a general decline. In the period 1940 to 1951, assessed values along Hudson Street fell from $413,000 to $362,000; and those on Washington Street from $3,390,000 to $2,585,000. On Harrison Avenue there was a rise from $1,330,000 to $1,595,000, a reversal due entirely to new Medical Center structures. Only at the extreme edge, along Tremont Street, was there any increase in taxable values, where we find a gentle rise from $4,514,000 to $4,726,000. Within the South Cove proper, the taxable base is melting away.

Fig. 8 shows the "topography" of assessed valuations in the region, and is taken from detailed maps accompanying this report. This topography shows the highest peaks of assessment along Kneeland Street, turning the corner on Tremont. The troughs of low value are east of Washington, with a valley running toward Tremont between Hollis and Warrenton Streets. The wide range of value is evident, as well as the influence of the downtown retail core. Along with the land use and building condition maps, this diagram furnishes essential data for planning new growth.

## ASSESSED VALUES

UNDER $5.00 PER SQUARE FOOT

$5.00 TO $20.00 PER SQUARE FOOT

$20.00 TO $80.00 PER SQUARE FOOT

SOURCE: CITY ASSESSOR

SCALE: FEET 0 100 200 300 400 500 600 700 800 900

# NEW ENGLAND MEDICAL CENTER AREA DEVELOPMENT STUDY

KEVIN LYNCH, CONSULTANT

FIGURE 8

This picture of economic and physical dilapidation is partly, but only partly, mirrored in what social information we have on the district. The area under study coincides precisely, except for three blocks, with Census tract G-2, and thus tabulations for this tract give a fairly close picture of conditions in the area in 1950. Detailed tables can be found in the U. S. Census itself. What follows is a selection of the most significant facts, from this and from city sources:

The 1950 population of the tract was 2715, a 14% decline from the level of 1940. Coupled with a decline in dwelling units in the same period of 903 to 599, we have a picture, both of abandonment, and yet of increased crowding within the remaining structures.

About one-third of the 1950 population were unrelated individuals, living alone. Most of the labor force were operatives and service workers, with some craftsmen, and a few clerks and small proprietors. The median income was only $1500 per year. The crude birth rate in 1953 was 25% below the city average, the death rate 75% above it. The death rate from pulmonary tuberculosis was almost 3 per 1000 -- 11½ times the city average, and one of the highest in the country.

One-quarter of the population was Chinese, and this proportion would be higher today, and also higher if the three additional blocks had been included. In the total population, males outnumber females by 2 to 1, and the dominant group is that of males from 35 to 70 years. But, among the Chinese, there was a significant swelling of the population in the age group below five years, and in the females from 20 to 30 years of age. The signs of the recent formation

of young families, and the sudden accession of children to an unbalanced society, were unmistakable.

Police records, on the other hand, show a substantially smaller proportion of major arrests in the South Cove than in other in-town areas, such as the South End itself. By repute, as well, the South Cove, while "poor", is generally thought of as being a "decent" area, at least until the recent exodus, and particularly on the east of Washington Street.

This is a region, then, of physical dilapidation and abandonment, and of mixed and shifting use, declining values, of low incomes, low rents and poor health, but not entirely one of social disorganization. Largely, perhaps, because of the two community-oriented nationality groups, Syrian and Chinese, the area is more stable, more self-regulating, and socially healthier than might be expected from the physical and economic indices.

Interest Groups

Within such a mixed district, there are a large number of groups who have some stake in it, and who have greater or lesser power to act in defense of that stake: the garment trades; the furniture stores; the taverns; the lodging houses and the single men; the Chinese and Syrian communities; the theatre interests; the local stores and services; the various factories, jobbers and contractors; the numerous institutions. Some of those having the strongest claims in the South Cove should be mentioned briefly.

The garment trades occupy the tall lofts on the northern fringe of the area, as well as more extensive territory on the other side of Kneeland. Sewing machine and parts companies, subsidiary to

the trade, are scattered deeper into the South Cove district. The garment trades are an important industry in the city, in reasonable economic health, but many of the units are small, have little capital, and require fairly inexpensive space. There is some need for growth, or for replacement of present space, and plans for new structures in the New York streets redevelopment area are under discussion. Since many units could not make this move, the industry would be split. Since proximity to downtown stores is preferred both for buyers and by the workers, the present location is more desirable. Thus the trade would like to remain, and, if possible, to have some room for expansion. Better loading facilities and a convenient subway stop are also strongly desired. An open sitting space for workers in the noon-time would be a major improvement.

The furniture salesrooms, which pin their flamboyant signs to the dingy facades of lower Washington Street, are a well-defined and well-organized use that have a stake in staying where they are. They need cheap space, both for sales floor and for warehousing, and want an established location near the edge of the principal business district. A similar set of salesrooms can be found north of the city's center, near Scollay Square. These firms, selling cheap furniture on installment terms, operate with little capital, and tend to come and go rather rapidly. There are several unused vacancies in their frontage at present.

Ten years ago there was a strong Syrian community in the South Cove, with both Greek Orthodox and Roman Catholic churches, special stores and restaurants, and many other institutions. They dominated the area and filled the school. Since then there has been a rapid

outward movement to the South End and to Roslindale, leaving only a few families on Oak Street and upper Harrison. Only 10% of the present school children are now Syrian. The Orthodox Church has moved out, with hardly 5% of its parishioners left in the area; and the Catholic Church is about to move. A few families remain for reasons of convenience, cheap rent, or ties of property. Many of them have strong sentimental attachments to the area, but seem resigned to moving in the end. As might be expected, there is some friction between them and the incoming Chinese.

The Chinese Community

Of the 3 to 4,000 Chinese people in the metropolitan area, perhaps 1800 to 2000 now live in this immediate neighborhood. But definite information is hard to obtain. Before the war this was predominantly a population of single males, due to the Oriental Exclusion Act. Recently many war brides have come in, and the resulting children have brought new life to the community. The Chinese now occupy most of the houses on Tyler and Hudson Streets, and are moving into the southern end of Harrison. This housing is in general of poor quality, but they pay high prices for it. It is presently in short supply, and large sums for rehabilitation are often put into what are essentially rotten structures.

The group is kept together by strong community ties, by the hostility of the general society, by the need to be close to their work in the restaurants and stores of Chinatown, and, in some cases, by the inability to speak the language or follow the customs of the world around them. As long as group support is needed, or as their major economic opportunities are in Chinatown itself, there will be a

need for housing close by. The takings for the new expressway will demolish many Chinese-occupied dwelling units, and leave the community disturbed and pressed for housing. Their principal desire at the moment is to be left alone.

Community opinion is not unanimous, however, and some of the younger generation are pressing to get out into the mainstream of American society, to find broader economic opportunities, or to enjoy better housing. A number of younger people, especially those with children, have been able to escape to Dorchester or other areas, despite external resistance and prejudice. Others would like to build a better community in the present district, if they could find a way. Although in the future many Chinese people will or should move out of the South Cove, it would appear that Chinatown itself is firmly anchored and that there will be a continuing demand for at least the existing number of dwelling units. If so, then there is a patent need that these be replaced by decent homes and that adequate recreation facilities be provided.

A number of institutions serve this community, including the Benevolent Association, which is the official spokesman for the group; a Buddhist Temple; and a Chinese-American Legion Post. Located in the South Cove itself are the Chinese Y.M.C.A., the Chinese Christian Church, and the Maryknoll Sisters, a Catholic order working with immigrants, young children and older girls. All of these want to remain close to the community, need some space for growth, and urgently feel the need for expanded recreation facilities.

Public Buildings

The major community institution in the South Cove as a whole

is the Quincy public school on Tyler Street. Of timber framed into brick bearing walls, it is 108 years old. The tiny paved yard is the social focus not only for the children but for the Chinese women as well, and contains one of the two trees of any size in the entire district. The school operates a kindergarten and first through third grades, plus a sixth grade temporarily taken over from the closed Andrews School. For other grades, children are sent to the Lincoln School on Arlington Street. For many years, enrollment in the Quincy School was declining, and it was slated for eventual abandonment. Attendance beginning with last year's second grade, however, went up to 80 per age group. The expressway demolitions and the clearance of the New York Streets area will again make a case for abandonment, but the local parents are determined that their children should not have to make the 20-minute walk, across several dangerous streets, to the Lincoln School. As long as a substantial residential community remains in the South Cove, a good case can be made for retaining here a school for the youngest children.

The city also maintains another structure on Tyler Street which contains a gymnasium, a branch library and public baths, all of them important local services. The building is of brick, and is in reasonable condition. Attached to it is a narrow paved playground, almost unequipped.

Near Kneeland Street is the St. James Roman Catholic Church, once the focus of the Irish community. Now it is the "downtown church" of Boston and has no local ties. It needs protection against possible overbuilding on the corner of Harvard and Harrison. A third Catholic institution in the South Cove is the Don Bosco Technical School, which has taken the old Brandeis premises on Warrenton and Common Streets.

It serves boys from all over the city and has little interest in its immediate environment, except in desiring additional space for a youth center.

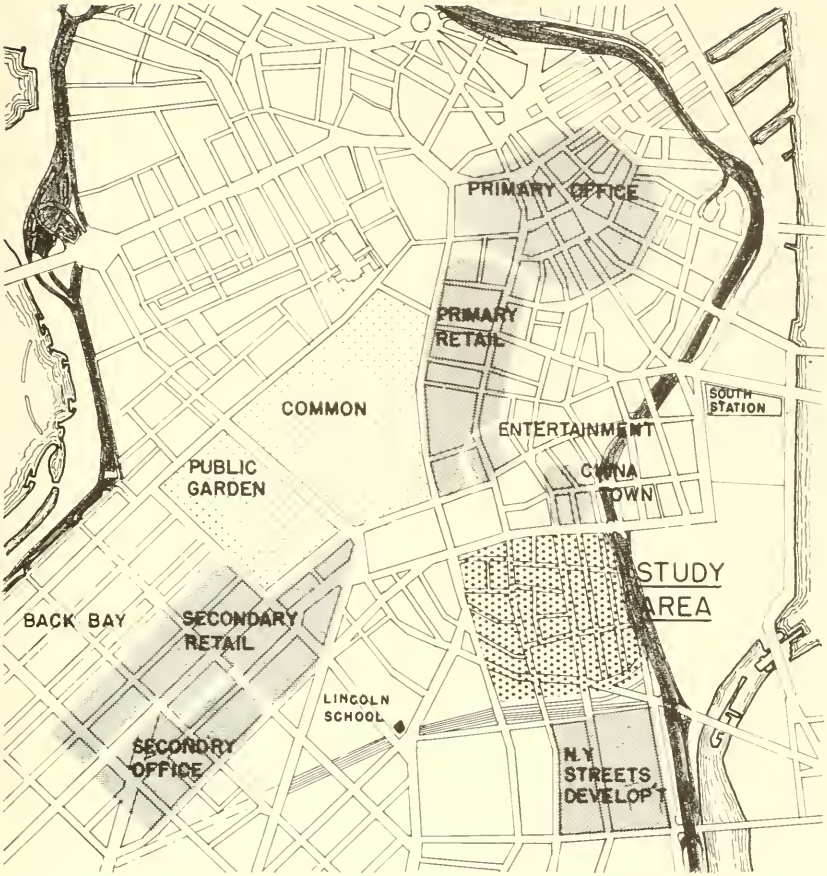
The remaining institutions in the area are the Morgan Memorial (whose main buildings are, however, just outside the study district), the Rufus J. Dawes Hotel, a charitable lodging for homeless men, and the Sheltered Workshop. None of these have plans for significant expansion, and the Sheltered Workshop has some problems in continuing its operations. The Morgan Memorial manages a small fund used to help individuals to finance or recondition housing, and might be interested in some small-scale development or rehabilitation project.

The New England Medical Center itself, which occupies commanding buildings in the district, and is the only essentially growing institution in the South Cove, serves the area to some extent through the Boston Dispensary. But most of the work in the Center is unrelated to the neighborhood, and it is locally regarded as a somewhat alien, but not hostile force.

We may summarize by saying that the group with the strongest stake in the district, along with the Medical Center, is the Chinese community; and that the most important institutions in the South Cove are those that serve them, including the Quincy School.

The South Cove As A Part Of Boston

For a deeper understanding, the study area must be seen in its relation to the central city as a whole (see Fig. 9). It lies at the edge of the downtown retail and office district, just east of the point where that district bends rather uncertainly to the west around the Common, and runs out Boylston Street toward Copley Square. As an




RELATION TO CENTRAL BOSTON

SCALE 1 INCH = 100 200 300 400 500 600 700 800 900 1000 FEET

NEW ENGLAND MEDICAL CENTER
AREA DEVELOPMENT STUDY
KEVIN LYNCH, CONSULTANT

FIGURE 9

immediate fringe region to a non-expanding central core, the South Cove endures mixture and uncertainty of use, and obsolescence of structure. It lies across major connectors of the core with the south, and is inevitably cut up by them and by the utilities that run along them. It must receive the daily deposit of parked cars which can get no nearer to the center.

At the same time, it enjoys the advantages of proximity to the entertainment, shopping, transportation and other facilities of the core, and, in potential if not in actuality, has the great advantage of visual and psychological association with the Common and with the heart of the city. In fact, this district, along with the few blocks just to the west, has a unique position in Boston as being the area, ripe for new development, which has the greatest proximity to both the major and minor foci of Boston: the State Street - Post Office Square - Washington core, and the Copley Square-Boylston subsidiary. It lies, as it were, at the rather weak "hinge" of an extended central district. This special accessibility, if exploited correctly, would increase the value of the South Cove for certain manufacturers, for semi-retail operations, for high-density residence, and for the Medical Center as well.

From the standpoint of the city, strong commercial development at this hinge position is vital, if it is to pull its central district together, and to re-establish it as a unit. Such development is particularly critical along Tremont Street and westward, and the rebuilding of the South Cove would do much to furnish a solid "anchor" for it. Now lost behind the tall lofts and gaudy signs of Kneeland Street, physically depleted, and exerting an increasing financial drag

on the city's forward movement, the South Cove could then return to a positive role.

City Plans

Fig. 9 also indicates certain city plans which will affect this area. Principal factor is the new Fitzgerald Expressway, which will encircle the central city, and connect by fast radials to the edges of the metropolitan district. Here it will pass along the line of Albany Street, forming a sharp boundary to the east, and, with its connections to Kneeland and Broadway, greatly increase the accessibility of the South Cove to the entire Metropolitan region. That is, it will increase accessibility if the problems of access and storage for the great quantity of cars can be successfully handled. This new route will be of capital importance for the redevelopment of the South Cove. Completion of this part of the structure is expected by 1958.

It has been proposed that the Washington Street elevated, now emerging from the subway just south of Bennet Street, be put underground, and that it be shifted to Shawmut Avenue just before or just after crossing the Boston & Albany tracks. This is a long-term possibility, and any plans should allow its eventual accomplishment, but a consideration of the expense involved, and of the relatively small return, at least directly to the transit system, makes action on this proposal highly uncertain.

Certain other problems affecting the South Cove are currently under study in the Boston City Planning Board. These include the development of the area on and west of Tremont Street; measures to improve the traffic capacity of Harrison and Tremont; the possibility of a new major collector street along the north side of the B & A

tracks, and a study for a new zoning ordinance setting up principles of use classification, density, and building line regulations to which, if adopted, new development in the study area must conform. Yet since the ordinance is still in a formative stage, the details of districting, or even of regulation, affecting the area may in their turn be influenced by a sound local area plan.

Market For Land

The accompanying report by Prof. Atwater, marketing consultant, gives a careful appraisal of the probable demand for land in the South Cove region, and therefore suggests the economic use of the area as it now stands, and the estimated value if it were cleared, prepared, and put up for sale. The report points to the value-producing proximity of the central retail area, which is yet sufficiently removed to discourage the most intensive retail uses. Probable commercial re-uses are of a transitional type between central retail and manufacturing. The report further refers to the coming of the Expressway as the major new economic influence in the area, bringing both access and visibility to thousands of passing cars.

Even with this influence, the report is discouraging as to rebuilding and re-use solely by unaided private effort, except in a few spotty locations. Were coordinated replanning carried out, however, it foresees the economic possibility of re-use for office buildings and for specialty and consumer's hard goods retail in the few available locations along the northern boundary. The eastern edge, visible and accessible to the Expressway, would provide excellent locations for parking garages: large volume "one-stop" retailing firms such as Wards; or structures housing the combined sales, distribution, service display

and office space for the regional distributors of major manufacturers.

In the interior of the South Cove tract, high-value re-use is less probable, except for some small retail shops on Washington, depending to a great extent on the activity of the Medical Center. Elsewhere, land might be saleable for center-oriented light manufacturing at low land values. In this case, however, the area might better be used for housing or special projects. Development of a strong Medical Center here, rather than compete for valuable commercial land, would strengthen private development along the main thoroughfares by insuring a stable and attractive interior core.

Above all, this study reinforces other indications of the need for a strong initiative in the South Cove - that it will not renew itself automatically, but that with coordinated public and private action it may become a healthy unit of the city, providing space for new housing, for a flourishing medical unit, and for high-value commercial uses of special types.

THE NEW ENGLAND MEDICAL CENTER

The New England Medical Center is housed in a complex system of buildings clustered about the original location of the Boston Dispensary on Bennet Street. The administrative system, the product of a long series of outgrowths and affiliations, is even more complex. The Center itself is at present largely a coordinating body, which also provides certain common services and holds some common real estate. The four units within the Center are independent, although with interlocking directors and functions.

The Boston Dispensary, occupying the cluster of buildings on Bennet and Ash Streets, is fundamentally an out-patient clinic and a center for home care for Boston residents. It furnishes certain clinical services to the other units of the Center as well. The Boston Floating Hospital, at the corner of Nassau and Ash Streets, is a children's unit, using the clinical services of both the Dispensary and the Center Hospital. The Center Hospital, on Bennet and Harrison, is a center for the referral of special cases, diagnostic problems in particular, from doctors and hospitals in the Boston area, and from the entire New England region. The Tufts Medical and Dental School, on Harrison at Harvard, trains general practitioners, dentists, and dental specialists, particularly for New England. Its students gain their practical experience in the other units of the Center, as well as in more generalized hospitals elsewhere in Boston. The professional staffs of all these four units overlap to some degree.

With a total staff of about 1000 persons, the Center serves an average of nearly 200 in-patients, and of over 300 out-patients,

per day. This does not include the home-care services. In all of its various structures, the Center occupies about 552,000 square feet of floor space on a net ground area of 143,000 square feet: a floor area ratio of 3.9. Some 90,000 square feet of ground are held by the Center in addition, including a few old structures in other use, but principally in open parking lots.

Condition of the buildings varies from the just-completed Posner dormitory, to the 70-year-old Dispensary building, with its timber construction and settling, weakened floors. Almost all the structures show the effects of piecemeal growth, constant change and re-equipment. This is particularly evident in the tangle of roofs, ramps, light wells and difficult spaces that make up the Dispensary, Middle and G.U. Buildings. But even the newer structures are cramped on awkward pieces of land, in poor relation to other buildings and to each other.

Despite awkward interrelations, however, most of the buildings still have years of useful life ahead of them. The structures whose continuance may presently be questioned are the old Boston Dispensary itself and the Medical Center building next to it on Bennet Street, a converted tenement now housing Common Services and the Cleft Palate Clinic. A rational plan of improvement should foresee the razing of these two in about ten years' time.

Medical Center Problems

The Medical Center has a number of problems, more or less acute, which arise out of, or have a bearing on, its physical plant. First, and perhaps most fundamental, is the widespread conviction among the staff that the Center has a "need to grow". This does not

arise primarily from the present space shortages or because of the new units now desirous of affiliation, pressing as these immediate questions are, but more from a sense that the Center must, and will, substantially broaden and balance its services, so as to become a top-rank medical center. A plan for physical growth is one of the preparatory steps.

Second, staff opinion agrees on the need for continuing to increase the integration of medical and service functions: clinics and laboratory facilities, services for the staff, and so on. Unnecessary duplications should be avoided, and, as far as possible, the system must begin to act more and more as one medical center rather than as an assembly of units. This report has taken this as a basic assumption, and made plans in terms of the Medical Center as a whole rather than for separate units.

A series of problems arises from the general location of the Center in the South Cove. There is congestion of buildings and of traffic; a dingy environment which repels both patients and staff; noise, dirt and heat. There are no trees or open spaces; windows look into light-wells or the backs of other buildings. The rumble of the elevated and of traffic disturbs the patients' sleep. Staff members dream of a Center out in the suburbs, with room for grass, light, air, and growth.

This wistful conclusion overlooks the lack of necessary connection between these problems and a central location, however. Traffic may be inescapable in the center, but buildings sited so as to receive every tremor from it are not. Higher densities are needed at the city's core, but with good planning this does not mean "congestion", with its implications of confinement, confusion, lack of light and air.

Trees, open spaces, and a good environment are quite possible, although of a different character from in a suburb.

The central location has some very real positive advantages, moreover. Properly handled, it means excellent accessibility by car and public transportation to the whole of the metropolitan district, and to the air, rail and bus termini that connect the metropolis to all distant points. This can be a distinct advantage for a specialized center having a large tributary area. The South Cove also means easy access to the shopping, hotels, the entertainment of the downtown area, a pleasure and a convenience not only to the staff but to the ambulatory patients and to visitors as well. With a little skill and effort, the seeming disadvantage of the Center's present location can be reversed, to become a prime asset.

One serious, if somewhat intangible, problem arises from the particular location and siting of the Center's buildings, lost behind the signs and brickwork of Washington and Kneeland Streets. To approach the site from the "last" subway stop on Boylston, or by car along Stuart or Tremont Streets, is seemingly to approach the edge of the world, or, at least, of Boston. No building is visible until the last moment, on turning the last corner. Even among the buildings themselves, visitors are continually asking for directions to "the entrance", the non-existent common door. No one of the writer's acquaintances, including medical men having some contact with the Center, has ever been able verbally to locate its position in Boston, nor to form any mental picture of it at all, except that it is "in a slum". This physical formlessness and lack of identifiable location causes confusion to visitors but also misses the important chance of establishing the Center

in the mind of the public by means of physical symbols. A new arrangement which will overcome this defect, and take advantage of the Center's proximity to Boston's center, is urgently needed.

Not only does the Center have immediate space expansion needs, as will be discussed below, but it is essential that this growth now begin to occur in a coordinated fashion. Many problems of operation and of expansion or remodelling come simply from the haphazard relation of parts: the staggering of floor levels, for example, or the discordant angles of the walls, or the lack of a master plan for some such feature as basements. Growth over a period of time, or the fluctuation of functions, does not preclude such simple expedients as standard floor levels. Future building must be such that later additions, whether vertical or horizontal, are as easy as possible to make.

On a larger scale, a coordinated plan for the location of medical functions is equally necessary. While the Center may be too small as yet to feel the full effects of the scattering of related uses, or of unnecessary cross-traffic; yet in time it will surely do so. A decision on an overall functional pattern as a guide to future growth is a prime necessity.

A final, but by no means minor, problem of the physical plant is that of car parking. At present the area seems choked with cars, and the local residents grumble that "no one but hospital people can park", and yet professional staff must search long for a space to attend their patients, and harassed parents cannot leave their car to bring their child into the hospital. Growth of the Center, and the completion of the expressway, will of course only aggravate the problem. If the Center is to reap the benefits of its central location,

it must meet the problem on a scale which has not yet been attempted by other city hospitals. Substantial space must be given to parking, and three and four story cage garages must be resorted to, despite the higher parking fees or subsidy that will be required. Secondly, of course, the Center must improve its connection with the public transit system, the subways in particular, to encourage transit rides by those whose regular commuting makes the individual car unnecessary in the city's center.

At present the Center has accommodation for 305 cars in its parking lots. Computing the need conservatively as: 2 spaces for each 3 doctors; 1 space for each other 3 staff members; 1 for each 4 in and out patients on an average day; and 1 for each 8 medical or dental students; then present need is about 665 spaces, or more than double the existing supply. The future requirements, which will be markedly higher, are discussed farther on in this report.

The Direction of Growth

If there is general agreement that the Center will and must grow in the coming years, there is less unanimity as to the direction that growth should take, and how great it should be. Although to some extent this growth will be the result of forces and individuals whose actions cannot now be foreseen, yet a general forecast must be made, both to exercise intelligent control on future events, and to establish conditions that will make the desired growth possible.

Discussions with the staff reveal three basic directions of growth that the Center might take, not necessarily mutually exclusive, but still differing substantially in emphasis:

1. The New England Medical Center might expand into a full-

scale generalized teaching and treatment center. Emphasis would be on filling out the functions and component units to achieve a full range of medical fields. The question of a general hospital would be raised.

2. The Center might concentrate on being a specialized center of referral, drawing selected cases from the hospitals and practitioners of a wide region, and emphasizing functions which required unusual skills or equipment.

3. Main effort might go into fields currently opening up due to the expanding coverage of modern medicine; preventive work, industrial medicine, rehabilitation, medical insurance, and treatment of the "healthy" person.

Whether one of these alternatives, or others, or various combinations, should be the goal of the Center, is the province of the medical staff, and not of this report. Coordinated discussion of such basic policy is strongly recommended - if only, and this surely is a secondary reason, because it is necessary as a firm foundation for physical plans.

In the absence of such basic policy, the future growth estimates in this report have been based on general trends, immediate needs, and qualified opinions as to the probable types of units that would come into an expanded system. If the estimates are somewhat weaker in detail for the lack of a policy directive, they probably are not invalidated in their general summations of quantity. They will certainly be adequate for estimates of total future land requirements, which do not commit the Center to particular structures, but only to the acquisition of an area which is sufficient for maneuver and yet avoids waste.

Future Space Requirements

Current new space requirements definitely planned are a rehabilitation clinic and a dental clinic. Other proposals now under study are for a medical office building, nurses' dormitories, and the affiliation of an obstetrical hospital and a school of occupational therapy. Facilities which have been mentioned as eventually to be desired, some only as examples, are an Eye Institute, a Neurological Institute, and one of Industrial Medicine, a general hospital or one dealing with chronic diseases; the expansion of facilities in the medical and dental schools; and the affiliation of such auxiliary schools as physical therapy, nursing, dental hygiene, or prosthetic devices. Small apartments for staff members, married students, and perhaps for ambulatory patients, have also been suggested. Certain units may affiliate to the Center, of course, without coming physically to the South Cove location.

There are several methods by which the future space requirements of the New England Medical Center might be estimated. The most comprehensive attack would begin by an analysis of future medical needs in the entire Boston region, a method unfortunately beyond the scope of this report. Otherwise, opinions as to the preferred size of a mature, balanced medical center might be used; or historical growth trends from the beginnings on the Bennet Street site to the present be projected. Although these are useful as general checks, the most rational method available is to estimate the future growth of component units of the Center, according to their internal logic, and then by summation to arrive at total requirements. The smaller, non-systematic errors will probably smooth out in such a process, although consistent misestimates will of course persist. Due to the demand for central land,

the estimates have been made rather conservative than otherwise. The time period chosen has been twenty-five years, or up to 1980, which is about the maximum period for which long-range planning for physical facilities can be done. The estimate proceeds: first, by classifying groups of facilities with similar spatial requirements; second, by computing 25-year floor area requirements for these groups; and third by translating these floor areas, using density assumptions, into future ground space needs.

Functional Groups

Facilities have been grouped together which seemed to require a similar physical environment, and which should, ideally at least, be closely grouped in space. Note that, following the emphasis of this report on the Center as a whole, analysis has been made by functional divisions rather than by present administrative divisions. Although this does not mean that present units would in the end be submerged, it does imply greater future integration. Since these functional classes are used not only in the succeeding quantitative computations, but also as a set of building blocks in the proposed plan, they therefore take on some importance as assumptions of physical grouping. They are as follows:

1. Centralized facilities for therapy and diagnosis, which require the presence of the patient, and which are too expensive or too intermittently used to be generally distributed through the Center, or which must be concentrated for efficiency. This might include X-ray, cardiography, physio-therapy, metabolism, perhaps certain operating theaters, and so on. These are simply called central "clinics".

2. Semi-independent units, housing and treating in-patients,

including ward space, administration, and the facilities for therapy and diagnosis which are not included in the central clinics above. These are termed "hospitals".

3. Areas for the reception and treatment of patients who are not hospitalized, again exclusive of the facilities in the central clinics. This would include both the reception, emergency treatment and administration of regular out-patients, and also space for the consulting rooms of individual doctors. This is called the "out-patient center".

4. Laboratories necessary for treatment and diagnosis, which do not require the presence of the patient, and which should be centralized for service to all units for reasons similar to the central clinics. This might include pathology, blood, pharmacies, and so on. These are called "laboratories".

5. The various schools for doctors, dentists, and auxiliary personnel, with all their teaching facilities, except those that may come under the classification of central clinics, or of staff facilities.

6. The areas for research, originating in any unit, but which can be centralized for efficiency and interchange of ideas, and need not be directly connected to other operation functions. Certain other kinds of research, of course, are carried on within the operating units themselves, or in close proximity to them.

7. The facilities serving the staff and student personnel, whether it be dining rooms and lounges, or auditoria, conference rooms and centralized libraries. These are called "staff facilities".

8. The administration and servicing of the Center as a whole,

including supply, personnel, utilities, caretaking and so on. This is termed "central services".

9. Residential use, including both dormitories and also apartments for staff, married students, and patients no longer requiring complete hospitalization.

10. And, finally, the auxiliary space demands: car parking, circulation, and landscaping or recreation areas.

Future Quantity of Floor Space

Future floor area requirements for each functional class is then estimated, using the best available opinions. These growth estimates may be summarized as follows:

1. Space for the central clinics will double their present size in twenty-five years, reflecting the growth of the Center as a whole, as well as a general movement toward specialized treatment and out-patient work. In addition to doubling, the space estimates also include room for the two presently-planned facilities: the rehabilitation and dental clinics. The latter will, however, be located with the school facilities for functional reasons.

2. Two new, not large, specialized hospitals will affiliate to the Center, such as obstetrics or neurology.

3. A new out-patient center will be built, including doctor's offices, central reception, and emergency treatment.

4. Laboratories will double their present size, for reasons similar to those governing the clinics.

5. The Tufts Medical and Dental Schools will increase their space by 50%, exclusive of the dental clinic noted above. In addition, three new auxiliary schools will affiliate, such as physical or

occupational therapy, dental hygiene, or prosthetic devices.

6. Research space will increase by 50% in the period.

7. Present staff facilities will be increased substantially, by the addition of an auditorium, lounge, library, and conference rooms, and the expansion of present dining facilities.

8. Present central services will double in size, to carry the new Center.

9. Present dormitory space will require doubling, and some 200 small apartments for staff, students and ambulatory patients will be needed.

10. There will be reasonably adequate, but not lavish, car parking facilities, some in small areas close to the buildings, but mostly in parking garages. Demand will be computed as being equal to the estimated present need of 665 spaces (see p.37), times the ratio of the increase of total floor space in the Center, exclusive of residential use. It is further assumed that some land must be allocated to landscape setting and quiet recreation.

The detailed computations of floor space requirements under these estimates are shown in Table I. The final summation gives a total floor space requirement in 1980 of 1358 thousand square feet, including residential uses but excluding parking, an increase over existing floor space of just under $2\frac{1}{2}$ times. This is the sum of columns A & B, Table I. It is interesting to compare this with the historical trend of growth of the Center, Fig. 10, plotted on a logarithmic scale, on which constant rates show as straight lines. The dashed line indicates the constant rate of growth which statistically most nearly approximates the actual historical experience.

(text continued on page 46)

TABLE I - Future Floor Area and Ground Space Requirements
(figures in thousands of square feet)

| Item | Floor areas | | Proposed | Net Ground Area | | |
|---|---|---|---|---|---|---|
| | Present | Future additional | net floor area ratio | Present | Future additional (B÷C) | Total Future Requirement |
| | A. | B. | C. | D.** | E. | F. |
| 1. Clinics: | | | | | | |
| Rehabilitation | 10 | 50 | | --- | | |
| Other | 49 | 50 | | 27 | | |
| | 59 | 100 | 2.5 | 27 | 40 | 67 |
| 2. Hospitals: | | | | | | |
| Boston Floating | 51 | --- | | 10 | | |
| Center | 171 | --- | | 36 | | |
| Two new hospitals | --- | 180 | | -- | | |
| | 222 | 180 | 2.5 | 46 | 72 | 118 |
| 3. Out-patient center: | | | | | | |
| Present Dispensary | 11 | --- | | 3 | | |
| New Reception & Emergency | --- | 20 | | --- | | |
| Doctor's offices | --- | 40 | | --- | | |
| | 11 | 60 | 2.5 | 3 | 24 | 27 |
| 4. Laboratories: (Dispensary and Ziskind) | 23 | 23 | 3.5 | 6 | 7 | 13 |
| 5. Schools: | | | | | | |
| Tufts (less dental clinic) | 92 | 46 | | 14 | | |
| Dental Clinic | 21 | 24 | | | | |
| 3 new auxiliary | --- | 120 | | --- | | |
| | 113 | 190 | 3.5 | 14 | 54 | 68 |
| 6. Research: (Dispensary and Ziskind) | 42 | 21 | 3.5 | 11 | 6 | 17 |
| 7. Staff facilities: | | | | | | |
| Dining and Lounges | 8 | 8 | | --- | | |
| Auditorium, conference Library | --- | 40 | | --- | | |
| | 8 | 48 | 2.5 | --- | 22 | 22 |
| 8. Central Service: | 16 | 16 | 3.5 | 4 | 5 | 9 |

TABLE I continued

| | A. | B. | C. | D.** | E. | F. |
|---|---|---|---|---|---|---|
| Sub-total, Medical Center proper | 494 | 638 | | 111 | 230 | 341 |
| 9. Parking garages: | | | | | | |
| 1300 spaces* | --- | 390 | 3.0 | --- | 130 | 130 |
| Landscape and recreation | --- | 40 | 1.0 | --- | 40 | 40 |
| Sub-total, exclusive of residence | | | | 111 | 400 | 511 |
| 10. Residence: | | | | | | |
| Dormitories, nurses and students | 58 | 58 | | 32 | | |
| 200 apts. for staff, students & patients | --- | 110 | | --- | | |
| | 58 | 168 | 1.8 | 32 | 93 | 125 |
| Grand Total | 552 | 806*** | | 143 | 493 | 636 |

Notes:

* Total future parking demand estimated as present need times ratio of increase of floor space exclusive of residence: 665 x 2.3= 1530. Of this total, assume that $\frac{1}{4}$ of the added net ground area would be available for close-in parking, or 240 spaces at 320 square feet per car. This leaves roughly 1300 spaces to be provided in garages.

** This column includes only net ground areas used at present by Center buildings, and excludes other holdings, to the amount of 89 thousand square feet. These are mostly, but not entirely, in parking lots. The greater part of this reserve will be used in future growth, and not be available for parking.

*** Parking and landscaping left out of this particular total, to allow comparison with present floor space.

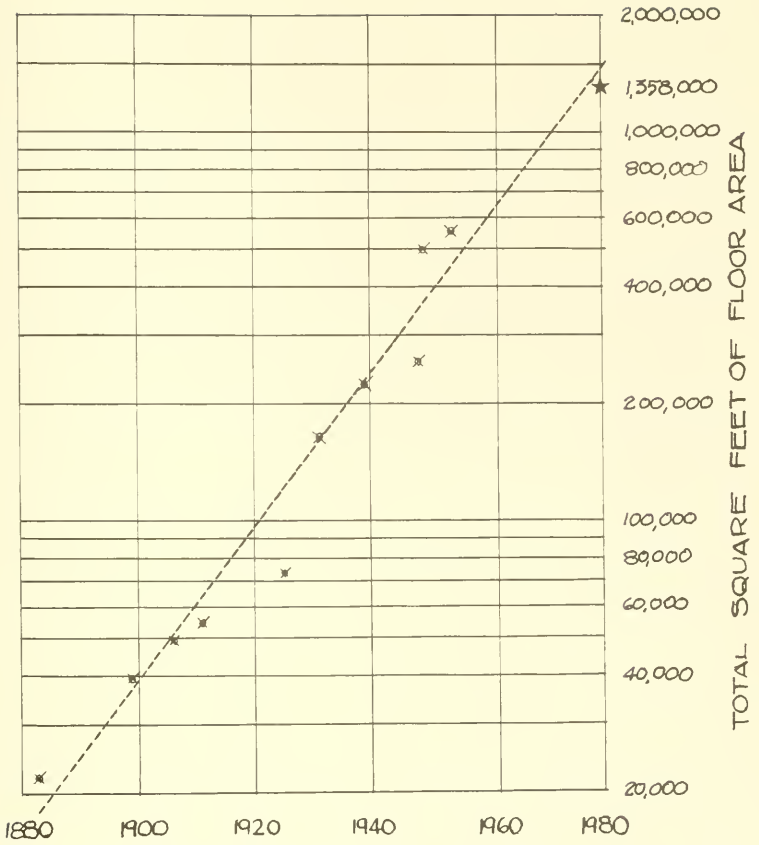
Projected, it would pass through 1980 at the figure of 1470 thousand square feet, close to but higher than the above estimate. The estimate also checks with general opinion as to the overall "mature" size at which the Center should aim. This is generally given as "two or three times" its present size.

Ground Space Requirements

Table I also details future needs of ground space. This entails assumptions as to the floor area ratio; or the ratio, in future construction, of floor space to the net ground area occupied by the building as well as its tributary uses such as immediate parking and access, landscaping, and so on. This is an important decision as to future density, which will have a major effect on the physical character of the Center. After some analysis of probable building types, and consideration of the central location, the following rather high ratios have been set:

1. Schools, laboratories, research units, and central services with their standard requirements would tend to be placed in tall, perhaps 12-story, structures, which would, however, be adequately spaced for light and air. This means a floor area ratio of about 3.5.

2. Staff facilities, and the structures encountered by the patient - clinics, hospitals, and out-patient center - will also have to use tall buildings for the bulk of their space, but some two or three-story buildings, courtyards, and other more intimate open spaces will be employed. This will allow unusual building shapes for specialized units, and give some contact with the ground, and a sense of human scale to the approaches. The floor area ratio must be reduced to 2.5.




PHYSICAL GROWTH 1880 - 1980

✕ - TOTAL FLOOR SPACE OF THE CENTER OR ITS UNITS AT PERIODS OF NEW ADDITIONS, 1880 TO PRESENT.
-------- THE CONSTANT GROWTH RATE, APPROXIMATING PAST EXPERIENCE.
★ - ESTIMATED FLOOR SPACE REQUIREMENT, 1890

SOURCE: CENTER FILES AND FUTURE ESTIMATES.

NEW ENGLAND MEDICAL CENTER
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KEVIN LYNCH, CONSULTANT

FIGURE 10

3. Apartments and dormitories will be in medium-high structures, or in tall ones with ample spacing, at a ratio of 1.8.

4. Parking garages will be four stories high, and largely cover their plots, giving a floor area ratio of 3.0.

For comparison, it may be interesting to note certain other existing or proposed floor area ratios:

| | Floor Area Ratio |
|---|---|
| Present Tufts Building | 8.0 |
| Pratt and Farnsworth | 3.9 |
| Dispensary complex | 2.9 |
| Posner Dormitories | 1.9 |
| Empire State Building | 32.0 |
| John Hancock Building | 7.8 |
| Chicago, approved project for offices and institutions on downtown fringe | 3.0 |
| New Bellevue-NYU Medical Center | 2.3 |
| New York City zoning ordinance: | |
| maximum allowable | 15.0 |
| East River area | 3.5 |
| garden apartments | 1.5 |
| Proposed Boston ordinance: | |
| maximum, downtown fringe | 4.0 |
| Philadelphia, maximum allowable for downtown residence | 1.9 |

Applying the proposed floor area ratios to the floor space requirements, as shown in the table, results in a future total ground space demand of 636 thousand square feet, including residence, parking and landscaping, or approximately 14.6 acres. Exclusive of residential use, this demand stands at 511 thousand, or 11.7 acres. It will be seen, in following the table, that a method has been used that assumes the retention of existing structures at whatever their density, and that floor area ratios were applied only to additional floor space requirements.

The total additional ground space needed, over and above presently held net areas, and exclusive of residential use, is 400 thousand square feet, or 9.2 acres. Most or all of the 89 thousand

feet of land now held, but not directly used for building will be available for this expansion. Thus the net area that, in an ideal case, would have to be acquired by the Center for everything except apartments and dormitories, is approximately 310 thousand square feet.

Quality of The Environment

Having reached conclusions about the quantitative growth of the Center, it is equally important to state something about the quality of the physical surroundings that are desired, and about the proper interrelations of the functional groups dealt with above.

First, it will be important that any development of the Center take advantage of its downtown location, of its nearness to transportation, entertainment and shopping. Access and parking must be designed to take substantial loads. Above all, the connection with downtown must be made apparent, a good entrance provided, and the whole given a distinctive shape that will be unmistakable to the public.

Second, the difficult quality of flexibility must be achieved which allows unpredictable changes to occur with a minimum of disruption. If anything be certain, it is that medical techniques and facilities will continue to change at a rapid rate, and that obsolescence will be an ever-present problem. But flexibility must be gained without hampering present functioning. Such techniques as the use of standardized space in large or tall buildings, which permits fluctuations and reallotments; a master modular grid of levels and distances and directions, which simplifies the joining of structures, or the planning of original units with column capacity to take on additional stories, are all useful. A certain looseness in the original siting, allowing interior growth, and a plan which does not place any major functional group in a location

which is completely boxed in by other groups, are equally necessary. Integration of specialized units, and good intercommunication, will in the long run prove the most adaptable pattern.

Third, although high buildings may be necessary for flexibility and for economy in an area of expensive land, yet the psychological effect on patient and staff must not be neglected. To the patient in particular, who is not so sick but that he may look about him, the awesomeness of a hospital can be magnified to fear by the sight of vast, cold buildings. The use of lower buildings, of varied and intimate spaces, of trees and gardens, and the sight of the outside world are all reassuring. Unimaginative handling can produce an efficient plan, and yet lose this quality entirely. It should be taken as basic that the Center provide as normal, as personal and easy, an environment for its patients as may be possible. In this sense, emphasis on day care in clinics, on home care, or the quartering of patients in normal independent residences, will minimize not only economic but psychological costs as well.

Fourth, on the operating level, it is vital that the functional groups be interrelated in a logical way. There must be a minimum of cross movement or over-extended movement, of activities which interfere with one another, or which are unnecessarily separated. Some of this confusion, into which the New England Medical Center may someday grow, is exemplified by the complicated pattern of the Massachusetts General Hospital today. To avoid this, new growth must be carefully fitted into a long range plan of distribution of functional parts.

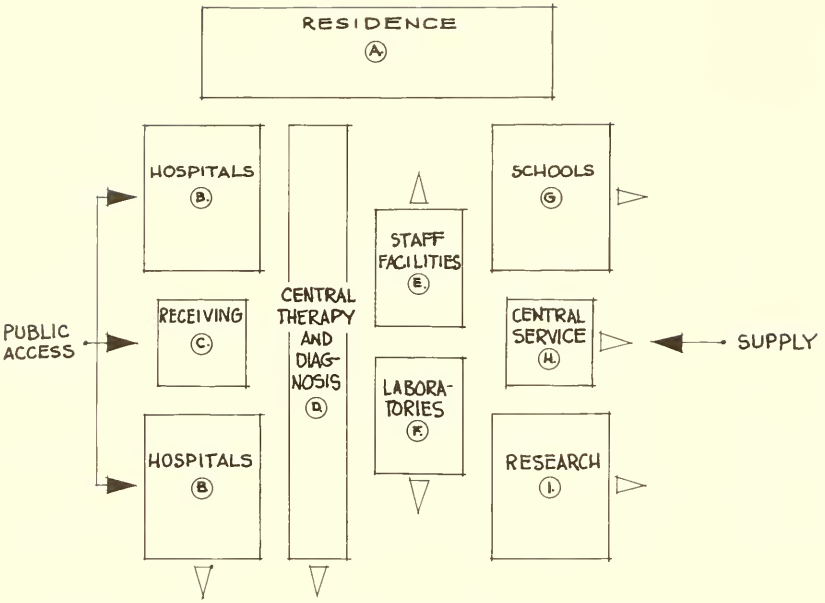
Finally, the new Medical Center must be beautiful, a quality

almost embarrassing to mention in "practical" discussion, if secretly wished for. The structures, the open spaces, the planting, approaches and detail must be so formed that they give us instant sensuous pleasure. The whole must not only be remarkable, flexible, and efficient but delightful as well.

A Theoretical Functional Pattern

Taking the classifications employed in the quantitative analysis above, how would they be arranged if there were no limitations on location? Clearly, the hospitals and the out-patient center would be placed on the side of public access, with the central clinics grouped closely behind them, thus minimizing the movement of patients, which is the most critical connection of all. Supporting the clinics and the hospitals would be the central laboratories, close enough to minimize the heavy daily traffic that centers on them, but without quite the priority of the patient-attended facilities. The staff facilities might be somewhat farther away, on the side away from the public entrance, yet still convenient to the hospital staff. Close to this unit, because of its connection to auditorium and libraries, and also reasonably convenient to clinics and hospitals, should be the schools.

The central services might be farther back, with their loading and utility functions, and yet should be on the mid-line to shorten the lines of supply. The independent basic research units, finally, with their factory character, supply and disposal problems, might also be farther back, and yet have some connection to the schools, conference rooms, laboratories, and other facilities. All these units, moreover, should be so disposed that they have, despite their intimate contact, at least one open direction of growth. Fig. 11 illustrates some




## DIAGRAM: SPATIAL ORGANIZATION OF A MEDICAL CENTER

A. DORMITORIES AND APARTMENTS FOR STAFF, STUDENTS AND PATIENTS
B. HOUSING AND TREATMENT OF IN-PATIENTS, EXCLUSIVE OF FACILITIES IN D.
C. RECEPTION AND TREATMENT OF OUT-PATIENTS, EXCLUSIVE OF D, AND INCLUSIVE OF DOCTOR'S OFFICES AND EMERGENCY FACILITIES.
D. ALL THOSE FACILITIES FOR THERAPY AND DIAGNOSIS WHICH ARE MORE EFFICIENT CENTRALIZED AND WHICH REQUIRE PATIENT'S PRESENCE.
E. DINING, LOUNGES, AUDITORIA, CONFERENCE ROOMS AND LIBRARIES.
F. FACILITIES FOR THERAPY AND DIAGNOSIS, WHICH ARE CENTRALIZED BUT DO NOT REQUIRE PATIENT'S PRESENCE.
G. MEDICAL AND AUXILIARY SCHOOLS.
H. GENERAL ADMINISTRATION AND SERVICE: SUPPLY, PERSONNEL, UTILITIES, MAINTENANCE.
I. RESEARCH WHICH CAN EFFICIENTLY BE CENTRALIZED.

◁ DIRECTION OF POSSIBLE EXPANSION.

NEW ENGLAND MEDICAL CENTER
AREA DEVELOPMENT STUDY
KEVIN LYNCH, CONSULTANT

FIGURE 11

of these simple relations, which might obtain in a new medical center unhampered by previous development.

Alternatives Of Growth In The South Cove

Having in mind the future space demands of the Center, and a grasp for the basic criteria of its physical character and organization, the analysis may now turn to the actual location in the South Cove, with existing structures and other physical limitations. If we seek for the possible new patterns that might be developed in the study district, we find that there are essentially no more than three. These three are illustrated in Figs. 12, 13, and 14, and are labelled A, B, and C. The only remaining possibilities are an abandonment of the present location, which is out of the question; or a movement outside the bounds of the study area. Since the area is bounded by main-line railroad tracks in cut on the south, a major expressway and railroad yards on the east, and the tall buildings and intrenched uses on Kneeland Street to the north, any movement across these three sides is hardly possible. A thrust across Tremont Street on the west, with its heavy traffic and decided change of use-character, is perhaps a very long-range possibility, but is highly dubious now and perhaps contrary to the larger interests of the city. We return, then, to the three possibilities, A, B, and C.

Scheme A would have the Center expanding west and south, from Tyler to Tremont Streets, and from Harvard and Hollis Streets to the new road along the B. & A. tracks. Scheme B, on the other hand, would keep all development east of Washington, and mostly east of the elevated tracks. Scheme C is essentially a linear plan, running east-west from the expressway to Tremont. If present structures are retained, these

exhaust the major expansion possibilities within the study area. Note that these studies are of the Medical Center needs alone, and do not show redevelopment possibilities for other uses. Also that the residential area for Center personnel is located generally, and at the proper scale, but is shown as an indefinite shape to indicate that integration with other local uses is recommended.

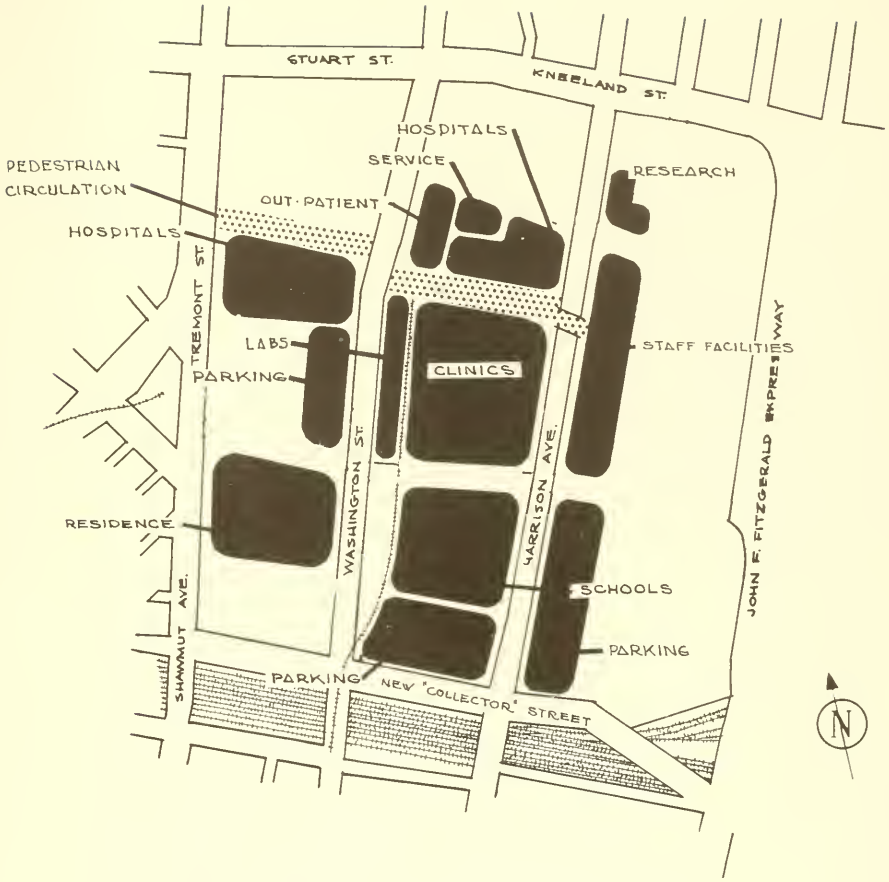
Scheme A

Of all these possibilities, Scheme A has the least to recommend it. It spreads the Center out over the major traffic arteries in a way that would make integration difficult; the interrelation of functional units is not ideal; a major relocation of the medical school is required; and the most expensive land is taken. The assessed value of the area occupied, exclusive of residence, is about $2,200,000 and acquisition cost may be estimated as about 1½ times this figure. The sole advantage of the scheme is that the area from Tyler east to the expressway is left undisturbed, or available for other uses. It seems clear, however, that from the standpoint of the Center, this alternative should be rejected.

Scheme B

Schemes B and C are worthy of more serious consideration. Scheme B is the cheapest solution, taking land valued at $1,500,000 for everything but residential use. It has the further advantage of avoiding the difficulties of straddling Washington or the elevated, although it would still be cut by Harrison. No major relocations are required, and a "front door" of some value is established on Washington Street.

It also has some inherent disadvantages. One of the most serious is that, as the Center accepts the Washington Street barrier




**SCHEME A** EXPANSION DIAGRAM

SCALE: FEET 0 100 200 300 400 500 600 700 800 900

# NEW ENGLAND MEDICAL CENTER AREA DEVELOPMENT STUDY

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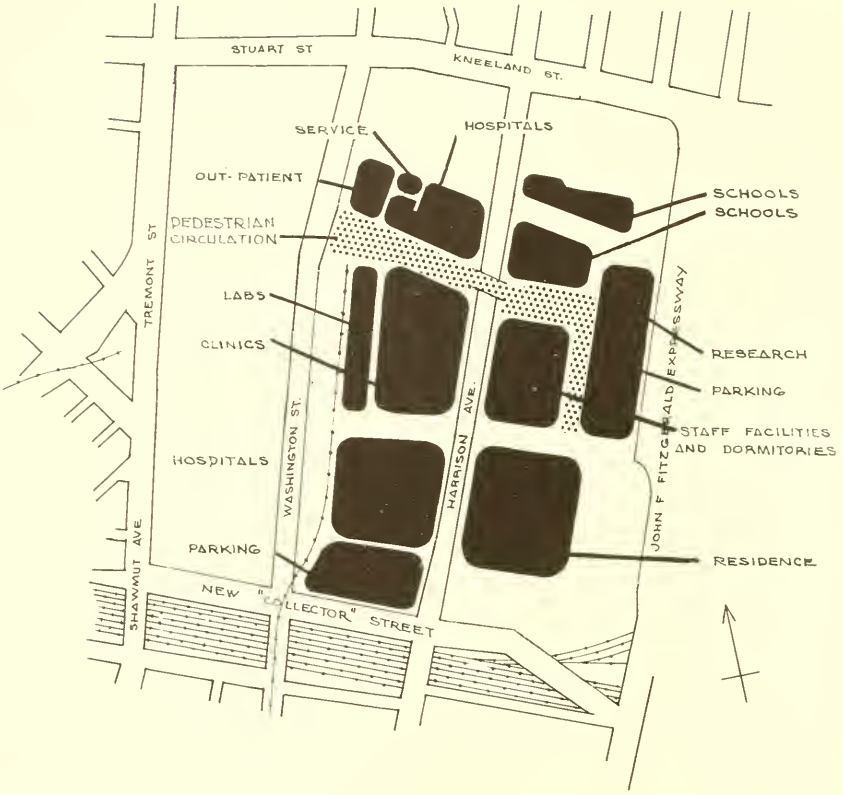
FIGURE 12




**SCHEME B** EXPANSION DIAGRAM

SCALE FEET 0 100 200 300 400 500 600 700 800 900

NEW ENGLAND MEDICAL CENTER
AREA DEVELOPMENT STUDY
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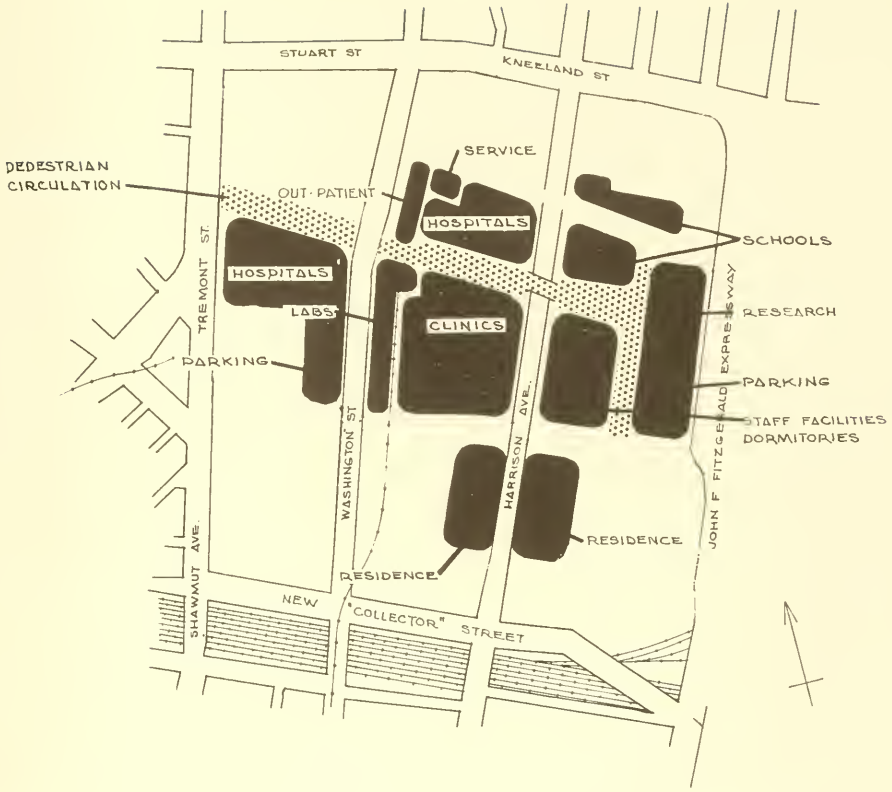
FIGURE 13




**SCHEME C** EXPANSION DIAGRAM

SCALE FEET 0 100 200 300 400 500 600 700 800 900

# NEW ENGLAND MEDICAL CENTER AREA DEVELOPMENT STUDY

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FIGURE 14

and leaves this western area to other uses, it inevitably boxes itself in. This plan allows no future direction of growth for hospitals or clinics or residence, if present estimates should prove too low.

Secondly, although the Washington Street opening is a distinct improvement, it is a connection to Tremont Street, the Common, and the best shopping district that is actually needed for a good visual and psychological tie. Lower Washington Street is far from ideal from this viewpoint.

Thirdly, although it might seem that traffic disturbance is minimized by keeping east of Washington, yet in fact all the major units must be strung along Harrison, now planned as a major traffic artery. By spreading along a street, rather than across it, attention is actually focussed on traffic, rather than otherwise. The east-west pedestrian way provided, while pleasant, will be secondary to the line connecting the main entrances on Harrison.

There are certain other detailed difficulties in the plan, such as the crowding of the laboratories behind the clinic space, and the city's problem of how the narrow strip between the elevated and Washington can be put to good use.

Scheme C

Scheme C avoids most of these difficulties by cutting directly across all the traffic arteries along an east-west pedestrian spine which connects every major facility from the expressway to Tremont Street. It is somewhat more expensive than Scheme B, involving real estate now assessed at $1,900,000, but is still substantially cheaper than Scheme A. It also requires the spanning of Washington via an overhead covered bridge, and the erection of a building over

the elevated at the point where it enters the ground.

All other factors seem to point in its favor, however, including the functional relations of parts, its esthetic quality, the creation of an unmistakable entrance and an unusual environment, and the freedom of parts to expand later in various directions.

Although Scheme B is an alternative which cannot be rejected out of hand, and C has the disadvantage of taking property with an assessed value of some $400,000 greater, nevertheless, it is the opinion of this consultant that the last scheme is by far the more preferable in the long run; and that the extra cost is not very large if one considers the value of the new structures that will occupy the space. Therefore, Scheme C is strongly recommended, and is used as a basis for subsequent detailed plans.

Method of Growth

How can such a long-range development be accomplished? There are a number of alternatives. The "alternative" of continued piecemeal expansion, as openings occur and pressures build up, must, of course, be rejected out of hand as incapable of producing the desired end.

Beyond this, it might be possible for the Center to proceed on its own resources, acquiring property as it became available in accordance with a master plan, and always trying to keep ahead of immediate building site needs. This is a program which can be initiated now, and would best be implemented by giving the Center the function of acquiring and holding all real estate in advance of use, with sufficient capital to acquire substantial reserves. By operating on the periphery of the area, long in advance of specific need, the Center could to some extent leap over the iron ring of forced sales and inflated prices that

inevitably incloses any growing agency.

Nevertheless, this technique cannot essentially escape the problem of the "holdout", of the exorbitant price, and of the last unwilling seller who makes it impossible to assemble a usable plot. The costs, the delays, and the disorganization of basic site plans, are intolerable in the case of a fundamental public utility such as a hospital. Furthermore, any basic reorganization of the area, of its wasteful street pattern or its confused land allotment, becomes impossible with such a technique. It would be necessary to go on fitting modern buildings to the tiny blocks of the mid-19th century. A coordinated system of real estate acquisition should indeed be instituted by the Center, but it is no substitute for some broader technique of development.

Another technique which has been suggested is the declaration of this area, or of a more general area, as a "hospital zone", in which only certain kinds of institutional buildings could be built. This would hold the land for future need, without danger of its loss to the encroachment of other uses, and would tend to prevent the artificial inflation of prices. Yet it seems unreasonable to pass the costs of holding land for future hospital use on to the individual owner, or to prevent him from using it in any way unless he either maintains it as is, or sells it to this one particular agency.

It is quite true that the zoning in the district should be coordinated with its proposed future use, and that the area into which the hospital will expand should be preserved from incompatible uses, such as factories or intensive commercial buildings. A residential zone, which also permitted various institutional uses including hospitals as a matter of right, is the proper solution. Thus the zoning

is used, not as an instrument of acquisition, but as a guide to development.

Urban Redevelopment

As to the provision of Chapter 121A of the General Laws, they are of no value in this situation, since an urban redevelopment corporation organized under this Chapter must be engaged primarily in the construction of housing. Finally, then, the Center may seek to interest the city in choosing the South Cove as a redevelopment project under the provisions of Title I of the U. S. Housing Act of 1954 and of the Massachusetts enabling legislation contained in Chapter 121 of the General Laws. Here the land would be taken, cleared and prepared by a city agency, the Urban Redevelopment Division of the Boston Housing Authority, and then would be resold to the Center and to other public or private agencies who were willing to purchase the land. Any losses, between the cost of the cleared and prepared land (including necessary new public facilities) and the amount received from the sale of this land, would be borne 1/3 by the City of Boston, and 2/3 by the Federal Government.

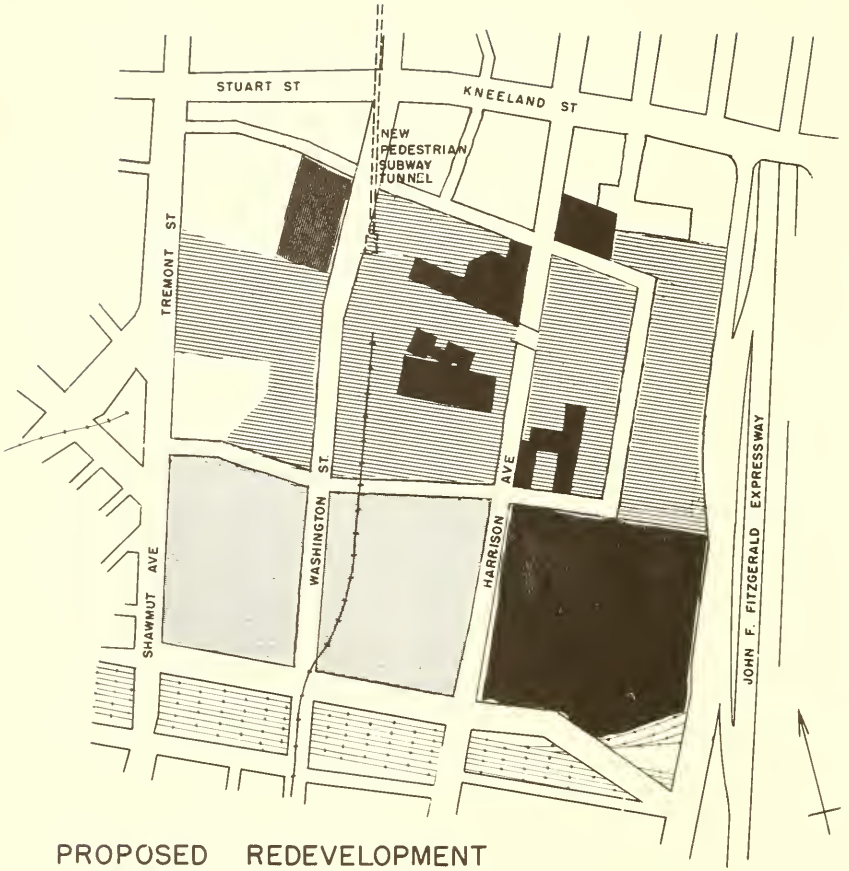
Use of this technique is clearly the most preferable course for the Center. Land will be taken by a government body at reasonable prices, and the operation and much of the prior detailed planning would be handled by an experienced agency. On the other hand, in order to interest the city, the public character of the Center and the desirability of improvement to the area, must be made clear, as well as more concrete economic gains, such as the stabilization of taxable values, or the introduction of new tax-paying uses. It will also be necessary to point out how the Center, via the salaries of its employees, and the money spent by the patients and visitors it attracts, is in itself a significant

part of the economic base of the city. The amount of city subsidy must be minimized - if possible, to the point of being covered by the cost of public facilities built in the area. In this particular case, of course, where the Center is the dominant user of the land, the amount of subsidy will be largely influenced by the price set on the sale of land by the Redevelopment Division to the Center. This price may be a matter for negotiation.

This report recommends that the proposed development be handled as a redevelopment project by the City of Boston. The detailed implications of this recommendation, and the steps to be taken by the Center in implementing it, will be discussed on the following section on the recommended plan.

Redevelopment of the South Cove for medical, residential and commercial uses is therefore strongly recommended. The area is clearly qualified for such action, being substandard and decadent, and predominantly in housing use. It is an area of population loss, abandonment of services and buildings, and of declining taxable values. No known agency or process will reverse these trends, unless the initiative is taken by the City of Boston and the New England Medical Center. To the Medical Center, redevelopment would mean a new environment and the chance to grow in an orderly manner. To the City, redevelopment will spell an increase, rather than a continuing decline of taxable values; healthy new commercial uses on Washington Street and along the expressway; an anchor and a powerful stimulus to the development of the critical "hinge" area on Tremont; decent housing and adequate community facilities for the South Cove residents; and the unfolding of a first-rank, mature medical center in the city. Such centers not only protect the health of Boston people and add to the prestige of the city, but bring many indirect economic benefits through the wages of their employees and the spending of their patients. In the South Cove there is a unique combination of opportunity: support of a fundamental public service; economic and physical rebuilding of a strategic downtown location; and a new life for the residents of a decadent area.

The form of the proposed redevelopment project is shown in Fig. 15. It consists essentially of three parts: two takings for special commercial use on Washington Street and below Oak Street along the Expressway; a section to be devoted to the Medical Center proper,




PROPOSED REDEVELOPMENT

- COMMERCIAL RE-USE
- MEDICAL CENTER RE-USE
- HOUSING & LOCAL FACILITIES RE-USE
- EXISTING BUILDINGS WITHIN RE-USE AREAS TO REMAIN

SCALE: 1" = 200'

# NEW ENGLAND MEDICAL CENTER AREA DEVELOPMENT STUDY

KEVIN LYNCH, CONSULTANT

FIGURE 15

running from the Expressway to Tremont, approximately between Harvard and Oak, and Hollis and Common Streets, and inclusive of present Center holdings; and a third taking for residence in the two blocks below Oak Street and west of Harrison. The frontage along Kneeland and Stuart Streets is left untouched, and certain few buildings are also left standing in the interior of the plot, as shown.

Traffic Proposals

The proposal takes into account the line of the new Expressway, and retains Tremont, Washington and Harrison as feeder streets to the downtown area, in accordance with comprehensive city plans. If Harrison Avenue were to be closed, it would have certain advantages for the Center, as, indeed, would likewise the closing of Washington Street. From the standpoint of the city, however, it seems clear that a greater, and not a lesser, number of unobstructed lines of circulation should in the future lead into the central business district. Harrison and Tremont are particularly valuable for this purpose, if made one-way, and there is no easy substitute that can be made for them. Therefore, this report concurs in their retention, and recommends a site plan which will minimize their effect. Harrison would be widened to a 60-foot right-of-way, and all parking or loading prohibited on it, raising its effective capacity to four lanes. It would dip five feet below its present grade between Harvard and Oak Streets, allowing the elevated grade of the Medical Center site to pass over it on a broad pedestrian bridge, yet leaving ample clearance for trucks underneath.

Broadway would eventually be closed off, and be replaced by a major collector street running along the north side of the railroad cut, which would link all the feeder streets in a logical way. This

proposal, which would allow a rational development of the land now bisected by Broadway, affects only the future redevelopment, for housing purposes, of the land in the southwest corner of the study area.

Oak Street, widened to 40 feet and extended to Tremont on the west, would be connected northward to Harvard Street, which in its turn would make a smooth connection with the present Dore Street. Both Harvard and Oak Streets would be blocked off from the Expressway at their eastern ends. Thus a U-shaped loop would be constructed, enclosing the Medical Center, and furnishing automobile access to all its elements. This loop would be one-way, since it would be difficult to widen parts of Dore and Harvard Streets to adequate two-way capacities.

Whitmore Street would be retained; Hollis Street would be closed to vehicles, but maintained as a pedestrian right-of-way. A loading area will be opened up behind Kneeland Street between Harrison and the expressway. All other streets in the area will eventually be closed off, thus producing large blocks suitable for open development, and substantially reducing the percentage of land in streets. Reduction of intersections will facilitate the flow of traffic.

The proposal accepts tentative city ideas for a one-way traffic system on the major feeders. This type of flow makes more intensive use of street capacities, and seems to be inescapable. If the Oak-Harvard loop is constructed, circulation within the area will be reasonably direct, and all Center elements easy to locate. The plan, therefore, is based upon Tremont being one-way south, or outbound; Harrison one-way north, or inbound, and the new loop one-way counterclockwise. Washington would be a minor street, perhaps one-way inbound, or, and this would be preferable for the Medical Center, a two-way street of

low capacity and speed.

Three parking garages are contemplated. Along the Expressway between Harvard and Oak the Medical Center would erect an 800-car facility connected both to the new loop, and, on the other side, directly to the southbound ramp of the Expressway. A Medical Center garage housing 300 cars would be placed on the west side of Washington at Oak. Another 400-car facility, combined with ground-floor stores, would be sited on Washington at Dore Street, and would be erected by the Medical Center or by private enterprise according to the picture of parking demand which later develops. This latter site is the one formerly proposed as a municipal garage. Together, these parking locations will form a system giving balanced service to all the Center elements, and connecting easily to the Expressway, Washington Street, the new loop, and the Harrison and Tremont feeders. Two garages will open directly on the main pedestrian axis described below.

It is further proposed that a tunnel be driven for some 450 feet from the Boylston Street subway stop, whose southerly end is just beyond La Grange Street, to a point just beyond Harvard Street on Washington. Here it could come up underneath the proposed new medical office building, and open directly on the central green, as well as on to Washington Street. A covered connection to the parking garage across the street could also be made.

This proposal would bring subway service to the theatres, factories and stores of this area, as well as to the Center, and thus support its redevelopment. A cross-under would be required between the north and southbound platforms of the subway at Boylston. Detailed engineering study will of course be needed to determine the

feasibility and cost of this. There is now a long gap between the Boylston and Dover stops, and a station for the South Cove would be of great value. The tunnel connection would provide an adequate substitute for such a station, at less cost, without introducing another stop for trains, and without prejudicing the eventual conversion of the elevated to subway operation. In this way another district liability could be converted into an asset.

It may also be noted that this redevelopment proposal leaves the present surface elevated line untouched. It raises certain problems of noise and amenity and awkward division of land, which can only be dealt with by skillful site planning in the medical and housing areas. It was deemed questionable, however, if the cost of putting this system underground could be justified for the city as a whole. It is shown as remaining in its present condition, therefore, while the plan would in no way obstruct eventual tunneling. Such an event, indeed, could only be a gain from the viewpoint of the South Cove.

New Commercial Uses

Two areas have been designated for commercial re-use. The first is a plot of 40,000 square feet net on the west side of Washington between Dore and Hollis Streets. Following the recommendation of the marketing consultant, it is proposed that this be occupied by a four-story combined parking and retail structure. The upper three stories and the rear part of the ground floor would be given over to parking, approximately 400 cars, with access to Washington and via Dore to Tremont. This facility would give strong support to existing entertainment, industrial and retail uses in the vicinity, and encourage further development. It could be directly connected to the new subway

tunnel. The Washington Street frontage on the ground floor would be developed for various small retail uses, in line with the present character of the area, but strongly dependent on the new foot traffic induced by the Medical Center expansion. It might be possible, depending on closer study of future parking demand, that this structure should be developed by the Medical Center rather than by commercial interests.

The parcels on both sides of Washington at Kneeland Street were also considered as potential parts of the total project. They are now occupied by structures in poor condition, and would have value for intensive office use, as outlined in the market report. Careful analysis of costs of acquisition and construction, when compared to probable gains in assessed values, shows, however, that taking these two parcels might be highly speculative in terms of loss or gain to the city. They are therefore excluded from the project boundaries.

The second plot to be devoted to commercial use is the large new block to be created between Oak Street, Harrison, the railroad tracks and the expressway. It has excellent accessibility to the expressway and to surrounding streets, and will be close to railroad freight facilities. It will have the key position for visibility from the expressway with its heavy traffic. The block will contain 240,000 net square feet, in a compact square shape, It is now wastefully occupied by streets, small lots and scattered buildings, and has a low assessed value. The market report considers this to be an excellent location for a "one-stop" retail facility such as Montgomery Ward, or for high-value discount operations, or combined sales and distribution. Conservative estimates of its value when prepared, and as a part of a coordinated re-structuring of the South Cove, seem to indicate the possibility

not only of a very substantial increment to taxable values, but also of a net sales profit on this portion of the development.

No other major commercial development is contemplated, since, especially in relation to the other demands on the land, no other areas have a strong enough natural suitability for extensive commercial use. Certain more scattered retail uses will appear, of course, such as local service or foreign specialty establishments in the housing area, or the small shops renting ground floor space in medical buildings along Washington Street.

Development Of The Medical Center Site

Fig. 16 illustrates the character of the site development proposed for the Medical Center, following the original Scheme C. This includes all uses other than residence. The plan proposes the purchase of some 400,000 square feet by the Medical Center, in addition to its present holdings.

It retains all existing buildings except the old Boston Dispensary structure and the Medical Center building on Bennet Street. Both of these, however, could remain as long as they proved useful without destroying the basic functioning of the scheme. In fact, the entire proposal has been developed so that, not only can existing structures continue to function, but that changes can occur gradually without disruption.

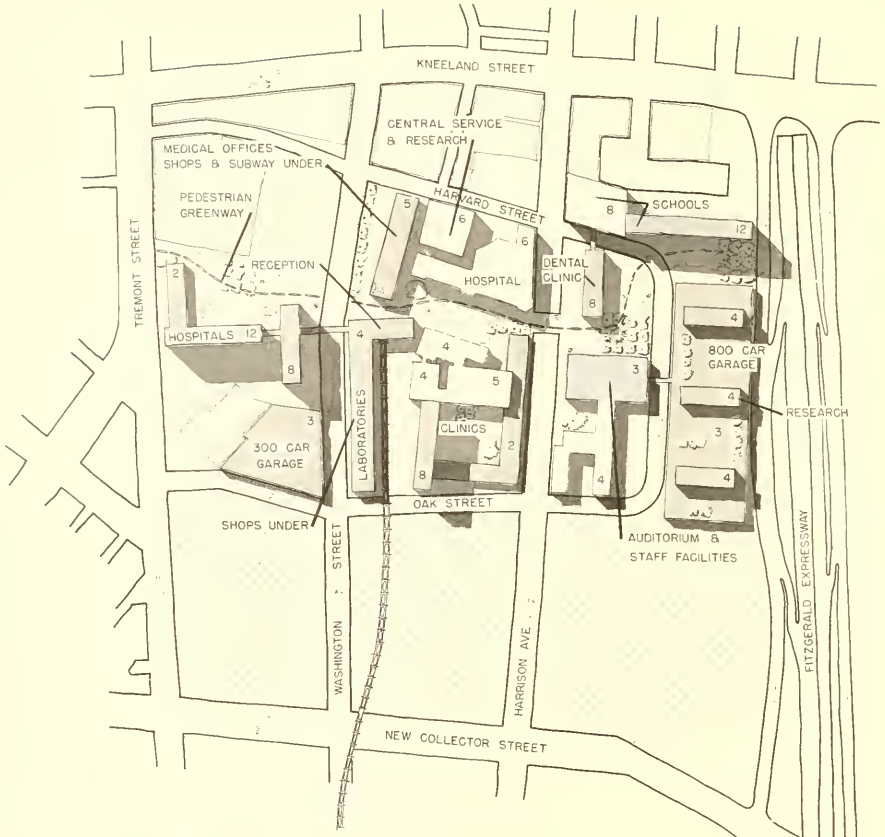
The motive for sketching a site plan of the Center must not be misunderstood. Definite building shapes and locations cannot be plotted until a definite program for each building is ready, and this will only occur as development unfolds. The sketch is not meant to illustrate fixed and planned structures, therefore, but is simply

intended to show the character of siting that is recommended, as well as to fix certain circulation and open space features. Such a sketch is also a necessary test of the more abstract land use diagrams that make up Fig. 15.

The Pedestrian Greenway

Key feature of the entire proposal is the pedestrian greenway that will run from west to east, linking the whole development, and giving it distinctive form. From the opening on Tremont Street, where it will be visible from the Common, it will go through a new park occupying the site of Hollis Street, now closed to vehicles. The walkway will serve the theatres, the parking garage, and the new hospital units. It will cross the relatively light traffic of Washington Street at grade, and, passing between the new out-patient buildings and the subway entrance, enter directly into the heart of the development, a green square flanked by the Center Hospital, the Dispensary, and the clinic facilities. This square will take over the land now occupied by Bennet Street and the structures on its south side. It will cover the original location of the Dispensary in 1856, and a historical marker might be appropriate.

Thence the greenway will pass over Harrison Avenue on a broad bridge, the ground being brought up to the grade of the present Center Hospital main floor. Across Harrison Avenue it becomes another landscape opening, furnishing quiet recreation and forming a setting for an auditorium on the south, and new school buildings to the north. The new parking garage will terminate the line, forming one of the principal entrances for those with cars, coming down off the Expressway. On the outside of this central pedestrian way, service drives will project




ILLUSTRATIVE MEDICAL CENTER PLAN

- EXISTING MEDICAL BUILDINGS TO REMAIN
- NEW MEDICAL BUILDINGS
- 2 BUILDING HEIGHT IN STORYS
- EXISTING STRUCTURES UNDISTURBED
- REDEVELOPED FOR NON-MEDICAL USE

SCALE: FEET 0 100 200 300 400 500 600 700 800 900

# NEW ENGLAND MEDICAL CENTER AREA DEVELOPMENT STUDY

KEVIN LYNCH, CONSULTANT

FIGURE 16

inwards from the Oak-Harvard loop to give truck and automobile access directly to the buildings.

The Functional Heart

At the functional heart of the complex will be the clinics, occupying the area south from the present Center Building to Oak Street. Directly across the green square from the Center Hospital, they will be physically connected to the principal out-patient and reception building. They will also connect, at the southern end, with the laboratories lying across the elevated tracks. The clinics will be housed in a group of eight and two-story buildings, facing on interior courtyards.

The out-patient center will occupy two buildings, joined into one structure by a common basement running under the entrance to the green square just east of the subway tunnel. The southern portion, with direct connections to the clinics, hospitals, and laboratories, will be the center of reception and administration, the "front door" of the Medical Center. The northern portion, set back from Washington, to provide a broad promenade, will house individual doctor's offices. With the new subway entrance on the ground floor, and a parking garage across the street, it will have excellent accessibility. Part of the ground floor facing on Washington might also be let out to high-quality commercial uses.

The Center Hospital would be left undisturbed, as would the majority of the Dispensary facilities. The Floating Hospital could remain in its present location, but might eventually prefer less cramped quarters across Washington Street.

Laboratories will occupy three floors of the structure between the elevated and Washington Street. Below them will be a ground floor

of shops fronting on Washington Street. Central services and research space would divide between them the present Ziskind Building, with its loading dock and rear access. Both of these latter buildings, with their standardized construction, could house many functions temporarily, such as schools, which would later get a more permanent home.

West of Washington

To the west of Washington would be the new hospital units, opening on the new Tremont Street hotel and office development, and close to stores, entertainment, and the Common. They would be connected to the out-patient center, the clinics, and other central facilities by an elevated bridge over Washington at approximately third-story level. This bridge would be the price that would have to be paid for the opening of the Medical Center site to the west. City permission for such a structure would have to be obtained as part of the redevelopment plan. An underground tunnel would also serve the purposes of connection, and would repay study, but might be difficult, due to the presence of major utilities.

South of the present Common Street to the Oak Street extension, and west of Washington to the blank facade of the Don Bosco school, the land would be devoted to parking for the Center. This area is largely devoted to this purpose now. Convenient to the new hospitals, laboratories and clinic buildings, it will, coupled with the new garage at the expressway, provide a balanced supply of parking space. As demand increases, it may in time become the site of a cage garage housing some 300 cars, perhaps with small ground floor shops fronting on Washington.

The Eastern Green

Around the present Tufts building east of Harrison would be

grouped the new auxiliary schools as well as needed expansion space for the main schools. The building south of Harvard Street would be the new dental clinic, which although not a part of the general clinical complex, would also have a front door on the central pedestrian way, while retaining the needed direct connection to the remainder of the dental school. These buildings, 8 to 12 stories high, would front on the eastern green.

Across this space to the south would be the new building housing the auditorium and other staff facilities. It could be directly connected by tunnel or bridge to the parking structure. Part of Posner Hall might also in time be converted to such staff uses. In any event, any future residential buildings should be kept south of Oak Street, to prevent the cramping of other facilities.

At the very eastern end would be the large 3-story cage garage, with a capacity of 800 cars, and topped by 4-story towers giving space for research work. The garage would be connected both to the Expressway and to the new loop. The main roof, on which rose the towers, would be planted to form a pleasant city garden.

Plans And Estimates Compared

It is interesting to compare the quantitative results of this sketch site plan with the original computation of need which served as the starting point. This is done in Table II below. Variations are, of course, the result of applying an idealized scheme to a real situation.

It is proposed that this Medical Center area be taken in two stages: first the area west of Harrison, and secondly the area to the east. Taking the westerly area first provides the critical space for hospital, clinic and out-patient facilities; makes the decisive opening to Tremont before the opportunity disappears; and gives the

Table II - Comparison Of Floor Areas Provided In Plan With Computations Of Need.

| Functional group | New or replacement areas (in 1000's sq. ft.) Computed need | Provided in plan | Floor area ratio Proposed as standard | Resulting from plan |
|---|---|---|---|---|
| Clinics* | 100 | 94 | 2.5 | 2.0 |
| Hospitals | 180 | 176 | 2.5 | 2.5 |
| Out-patient center | 71 | 77 | 2.5 | 2.25 |
| Laboratories | 46 | 48 | 3.5 | 3.0 |
| Schools** | 190 | 183 | 3.5 | 3.2 |
| Staff Facilities | 56 | 49 | 2.5 | 1.5 |
| Central Service | 32 | 36 | | |
| Parking | 390 | 342*** | 3.0) | 5.0 |
| Research | 63 | 56 | 3.5) | |
| Landscape & open | 40 | 49 | - | - |

* excluding dental clinic

** including dental clinic

*** excluding 110,000 in Washington-Dore garage

| Total additional sq. ft. of ground not now in Center ownership. | Computed as needed | Required in plan |
|---|---|---|
| | 310,000 | 400,000 |

residents in the Tyler and Hudson Street areas a longer time in which to meet the relocation problem. It also gears land acquisition somewhat more closely to the ability of the Center to absorb and use it. Indeed, from the Center's standpoint, it would be ideal if some agency

would acquire the land and hold it out of development until such time as it were needed for new medical buildings. It would probably be unfair to expect, however, that such holding costs be borne by someone else. Land not needed immediately could be retained by the Center in its existing use, or converted to open space or parking.

The Residential Area

Across Oak Street to the south, and west of Harrison the land would be devoted to residential use, to facilities serving that residence, and perhaps to special retail uses attached to the ethnic community, such as Chinese restaurants. Development plans have been left indefinite in this proposal, since the residential demand, other than for the Medical Center, requires a good deal of further study. The housing space would be devoted to the required medical apartments and dormitories, plus the relocation of families displaced by the project and others who may have strong reason for remaining in the district. This would particularly be the Chinese community, but other groups might also be interested. Special housing for the elderly, enjoying the proximity to the Medical Center, would be an example. Space for community facilities - churches or temples, a new nursery-kindergarten, with playground, the Chinese YMCA, local organizations, and so forth - would also have to be allocated. A peppering of restaurants or stores of special flavor, might be in character. Expanding businesses from Chinatown could benefit from the proximity to the new entertainment and hotel development along Tremont Street, or might occupy the new Washington Street shops.

The housing would be in three categories: public housing for the lowest income groups; middle-income housing for other

relocated families and for special groups such as the elderly, many of whom now pay substantial prices for housing; and, finally, dormitories and small apartments of medium to high rent for Medical Center patients and personnel. Center staff would benefit both psychologically and in terms of convenience by being set in a "live", if specialized, residential area, rather than being housed within the institution itself. Ambulatory patients and elderly persons would enjoy a more normal existence in such a mixed district, and the economic savings over ward care would be significant. Medical Center housing could be in tall buildings, of 1.8 floor area ratio, but the relocation housing, occupied by many families with children, should be at lower densities: possibly at 1.5, but preferably at floor area ratios of 1.0.

The allocated site, which will form two large blocks in the redeveloped area, contains 320,000 square feet net. It requires the relocation of Broadway for its proper utilization, which fits in with large-scale city considerations. The present elevated will in all likelihood continue to run through the eastern block, and must be set off by open space. It can be made a much more pleasant object visually, of course, with the use of a little paint. This difficulty, and the presence of the railroad in cut, indicates the necessity for tall apartment structures, which can be sited freely and can rise above surface noises. The density standards suggested above should not be compromised, however. The tall buildings should be allowed only if accompanied by abundant open space. By this means, this area can be made into a good, if special, residential district.

Public low-rent housing would be built by public agency, although there might be questions of priority here, if the Chinese

community wished to move in reasonably intact, as well as problems of housing for non-citizens. But how would the other housing be accomplished?

The South Cove Housing Corporation

It is suggested that a South Cove Housing Corporation might be organized, at the initiative of the Medical Center, but financially independent of it. Groups with strong interests in the area would be asked to participate in the organization and financing, such as the Chinese community or the Morgan Memorial. This agency would form itself as an urban redevelopment corporation under the meaning of Section 3, Chapter 121A of the General Laws, allowing payments in lieu of taxes and the right of eminent domain. This latter power would probably not be used, since the entire operation would be part of the redevelopment process.

The Corporation would proceed to plan, buy cleared land from the Redevelopment Division, and operate housing for both relocated families and medical personnel, but with the policy of turning the structures over to the using groups as soon as possible. Thus, in one case, an apartment building might be sold to residents as a cooperative, with the same powers as the parent corporation; in another, a dormitory might be sold to the Medical Center. Development could proceed on a continuing basis, with the fundamental motive of improving the area without profit. Locations for necessary community facilities or small commercial enterprises could be reserved, and community participation achieved within a workable structure. Other groups wanting to build housing in the area, but now outside of it, such as those interested in housing for the aged, might either join in the Corporation, or acquire from it the land they need.

Suitability For Redevelopment

This redevelopment proposal is believed to be in accord with the comprehensive plan for the City of Boston, although it must formally be declared to be so, and also designated as within a redevelopment area. A district would be cleared that is patently substandard and decadent, although detailed surveys may be required to show this officially. It is also predominantly residential, within the meaning of the 1954 Housing Act. Thus, of the total net acreage that would be taken for the Medical Center development, exclusive of land already in the hands of the Center, approximately 40% is now in predominantly residential use; 10% was until recently residential and is now vacated without replacement; 10% is in local service to the residence; and 40% is in other uses, including commercial, parking and institutions of larger than local scope. Within the total taking, including that for commercial and housing re-use, the existing land use proportions run: 43% residential; 11% vacated residential; 8% residential service; and 38% other. These quantities are shown in Table III following:

Table III - Areas of Existing Use (In 1000's of sq. ft. to nearest 5000)

| Present Use (net areas) | Total Area | Medical Center Area | Commercial Area | Housing Area |
|---|---|---|---|---|
| Predominantly residential | 350 | 140 | 70 | 140 |
| Residences demolished since 1938, not replaced | 85 | 35 | 35 | 15 |
| Residential service | 65 | 30 | 20 | 15 |
| New England Medical Center | 145 | 145 | - | - |
| Other | 305 | 140 | 100 | 65 |
| Total | 950 | 490 | 225 | 235 |

Judging from block statistics of the 1950 Census, the following dwelling units would be cleared by the scheme: 315 in the Medical Center area; 130 in the commercial areas; and 265 in the housing area. This gives a total of 710 units to be replaced, here or elsewhere. The figure is unreliable, being out of date and most likely inaccurate to begin with.

Few utilities other than minor branches will be disturbed by this plan, due to the retention of streets along which run the major concentrations. Even in the case of certain streets closed to traffic, rights-of-way are retained: thus the water lines on Hollis Street and on Hudson north of Harvard, plus the main sewer on Bennet, need not be disturbed despite the street closings. Exceptions to this are the high-pressure water line on Hudson south of Harvard and the main sewer on one block of Tyler Street. Both of these would have to be relocated to either Harrison or Albany. When Broadway is abandoned, there would also be disturbance to the gas and water mains in that right-of-way.

Other public works that would be required by the proposal, in addition to clearance and street closing, would be the widening of Harrison and Oak, the depressing of Harrison between Harvard and Oak, the new subway connection to Washington and Harvard Streets, and a new nursery-kindergarten school with playground south of Oak Street. While the widening of Oak Street, the depression of Harrison and the new school are of primary value to the South Cove itself, the other works are all of substantial value to the central city as a whole.

A tentative estimate of the costs of the redevelopment project has been prepared and is summarized in Table IV. This must of course be regarded as uncertain until more definite data can be gathered, but it presents a picture which matches the general conclusions based

on this report. Net project cost will be low, and the city's share of this amounts to $920,000, of which only $300,000 need be in cash, over and above public works and land donations. Meanwhile, despite the extension of the Medical Center's area, there will be a net gain of taxable valuations of $3,370,000, yielding an additional tax revenue of some $225,000 every year, or almost enough to cover the cash subsidy within the first year of the completion of improvements.

The conclusions of this table are based on certain assumptions as to costs, sales, and allocations, all of which are the best conservative estimates that can be made at this time. These assumptions are outlined below - not because they are felt to be authoritative, but so that as detailed studies progress, the effect of more accurate estimates on the final totals may be more easily assessed.

In computing gross project cost, it was assumed that acquisition cost would equal 1½ times the present assessed value, except for municipal property, which would be taken at its assessed value. The costs of clearance and general site preparation were estimated at $0.30 per square foot. The following specific major improvements were separately estimated and added:

A. The relocation of main utilities (sewer lines on Tyler and Oak, high pressure water lines on Hudson and Broadway, and gas on Broadway).

B. The widening of Harrison Avenue and its depression between Harvard and Oak; the widening of Oak and its extension to Shawmut; and the construction of a new collector street north of the B & A tracks.

C. The construction of a new pedestrian subway tunnel from

LaGrange to Bennet Streets, with the equipping of a new entrance.

D. The construction of a new nursery-kindergarten school in the housing area, with a playground and facilities for a branch library and small meetings.

Finally, a 10% surcharge was added for administration, holding costs, engineering and legal fees, and so on. These four items: acquisition, clearance, improvements, and administration, make up the gross project cost. These costs were allocated between the three major consumers of the redevelopment project: the Medical Center; commercial uses; and housing or local service uses. This division of costs was, of course, arbitrary in the categories of administration and of specific improvements. The school was charged to the housing area, for example; the utilities and streets to the areas they fall within or border upon; and the subway station 2/3 to the Medical Center and 1/3 to commercial uses. This arbitrary division is made only to clarify the role of the various users, and would not in fact be separated in the financial process. Thus artificial "negative" costs or grants can appear in these columns, but cannot appear in the total column.

Sales of land were estimated as: 400,000 square feet to the Medical Center at an average price of $6.00 per square foot; 320,000 square feet to housing uses at the subsidized price of $0.50 per square foot; and 280,000 square feet to commercial uses in two parcels: that on Washington Street for $8.00 per square foot and the southeastern Oak Street-Harrison block for $6.00 per square foot. These are conservatively based on the report of the market consultant.

Net project cost is the gross cost less the revenue from the sale of land, and amounts to $2,750,000. The city's share of this is

one-third, or $920,000. Much of this may be accounted for in the so-called "non-cash grants", however; including the value of donated land and varying percentages of the cost of public works involved. It has been assumed here that the city will be able to charge as non-cash grants 100% of the cost of new streets and utility relocations, plus 50% of the cost of the school and subway station. This amounts to $620,000, leaving a required cash grant of $300,000.

Table IV - Tentative Computation of Financial Loss or Gain to The City (in $1000's)

| Item | Total project | Medical Center Area | Commercial Area | Housing Area |
|---|---|---|---|---|
| Acquisition | 5600 | 2760 | 1070 | 1770 |
| Clearance & preparation | 270 | 90 | 90 | 90 |
| Specific improvements | 570 | 210 | 120 | 240 |
| Administration | 650 | 310 | 130 | 210 |
| Gross Project Cost | 7090 | 3370 | 1410 | 2310 |
| Resale | 4320 | 2400 | 1760 | 160 |
| Net Project Cost | 2770 | 970 | -350 | 2150 |
| City's share | 920 | 320 | -120 | 720 |
| Non-cash grants | 620 | 240 | 230 | 150 |
| Cash grant required from city | 300 | 80 | -350 | 570 |
| Present taxable values | 3340 | 1660 | 620 | 1060 |
| Future taxable values | 6660 | 0 | 5600 | 1060 |
| Gain or loss in values | 3320 | -1660 | 4980 | 0 |

Taxable assessed values, meanwhile, are assumed to become zero in the medical area, and remain unchanged in the housing area (since payments in lieu of taxes must at least equal former revenues). Based again on a very conservative reading of the market report, assessed values in the two commercial areas are estimated to stand at $20.00 per square foot of net land area, when improvement is complete. These assumptions result in a total gain of taxable value of $3,320,000, which at $67 per thousand would yield an overall additional revenue to the city of $223,000 per year. This yearly revenue is almost equal to the total cash grant outlay.

Initiative on the part of the City and the Medical Center, then, is sorely needed to meet the pressing problem of declining tax base, congestion and bad housing. When this initiative is applied through the redevelopment process the result will be a clear and lasting benefit to all parties.

## NEXT STEPS

The New England Medical Center should take several actions to ensure its future growth. First, the Executive Board as a matter of policy should be given the task of acquiring and holding real-estate for all units, at least until it is occupied by new buildings. The Board should have the financial reserves to purchase such property years in advance of need, helping to break out of the iron ring of high prices that tends to surround the Center. Such a step should be taken even if the redevelopment project goes through, since in that case substantial acreage will have to be bought and held.

Secondly, it is recommended that all new development proceed in accord with an official master plan for the Center, whether following the above proposal or some other. This is the only way to insure smooth, logical development. For example, were the above recommended plan adopted as it stands, then it would determine the proper locations for the rehabilitation institute, the dental clinic, new schools, the out-patient facility, and new hospitals.

Very important to the Center at this stage is a first-rank site planner or architect, who on a continuing basis would develop the physical plan. This would logically be one architectural firm, which designs all the buildings, thus providing continuous services and not intermittent building plans. If a common architect is not feasible, then a consulting site planner and landscape architect could maintain the needed coordination. In either event, imaginative ability will be even more important than efficient production of plans.

The development program will also require a strong public

relations staff, representing the Center as a whole, because of the work that must be done both with city and local community. Unless outside help can be obtained, it is recommended that a trained community worker, possibly Chinese, be included in this staff, to develop communication with the residents of the South Cove.

Community Cooperation

It will indeed be vital to work cooperatively with neighborhood groups, enlisting their support in a common venture. Most important will be the Chinese Community, and also the most difficult, since they are mistrustful, and disturbed by the expressway demolitions. It must be made clear that this plan represents an opportunity for new housing, new community buildings and new commercial locations for their people, and that some such positive action on their part is the only alternative to being pushed out entirely. This is true not only for this particular project, but in the long run for Chinatown as a whole, which is progressively being boxed in and whittled away.

Others that should be approached are the Morgan Memorial, for their general interest in the area and because of their housing rehabilitation program; the garment trade for its interest in a subway, in loading facilities, and possibly a park; and the Catholic Archdiocese, because of its three institutions in the area. The Syrian community should also be approached, although their interest in the area is declining.

Two other groups outside of the area may give useful support. The Housing Association of Metropolitan Boston is interested in building housing for the elderly, and has expressed some interest in the South Cove. The Association has had some difficulty in locating

a suitable site for their structures, and proximity to hospital and rehabilitation facilities has a great deal of logic. Secondly, the South End Planning Council is very much interested in the rebuilding and replanning of this section of the city. They could be helpful in enlisting community support and in advising the Center's staff on the techniques of community organization.

It will be important to bring the community into the project as soon as possible, allowing expression of opinion and as much participation as can be evoked. Political leaders should of course be contacted. Communication should be built up with local organizations, or where they are absent, their creation should be encouraged. A strong public relations campaign, to explain the Center and its needs to the community, would also do a great deal. Public opinion now seems to be, not hostile, but indifferent and aloof. An open house might help, or some extra service for local residents. Since one of the greatest problems of the Chinese people is their lack of economic opportunity, perhaps a campaign to hire Center employees among them might help both sides.

Community action might eventually converge toward the organization of the South Cove Housing Corporation suggested above, and to the preparation of its program of action. The Medical Center should be willing to take on some of the initiative for this new entity. From the standpoint of the city and of the community, one of the advantages of this project will be the presence of a strong institution which is willing to share in the leadership, a situation rarely to be found. Such a Corporation, of course, will in the end require a complete staff of administrative and technical personnel.

Action by the City of Boston

With relation to municipal cooperation, the most critical step is the preliminary approval of the South Cove as a redevelopment project, by the City Council via the recommendations of the Urban Redevelopment Division of the Boston Housing Authority. This means sufficient commitment by the city that it will appropriate planning money, or ask for preliminary advance funds from the federal government, for detailed study of the project. Joined to this commitment must be a declaration of the South Cove as a redevelopment area by the City Planning Board.

Such preliminary commitment is some distance from the final approval that clears the way for concrete action. Not only must the City agree to the project, but so must the federal government, through the Housing and Home Finance Administration, which administers the Housing Act of 1954. The federal government bears 2/3 of the net cost, makes low-cost loans, and furnishes technical guidance.

These final approvals are based on the technical findings of the detailed study which is initiated by the preliminary approval, and cannot be committed ahead of time. The City Planning Board must have declared the project to be in accordance with the comprehensive plan of the city. A 2workable program" for urban renewal, prepared by the City, must have been certified by the HHFA. Three to five years, from first studies to actual acquisition and clearance, is a pace of accomplishment to be expected.

Detailed Steps

In the detailed study, a number of points must be pursued. The feasibility of the subway tunnel should be determined. A permit

would have to be obtained to build bridges over Washington and Harrison. The school question will also have to be tackled: this report proposes that all but the youngest children walk to the Lincoln School and that only a new nursery-kindergarten unit will be needed. An A.P.H.A. survey of the housing would have to be made, on a sample basis, to demonstrate its substandard quality. A door-to-door population survey would be required to analyze the relocation problem that will be involved. A firmer program for the housing area would have to be developed, and more detailed cost and market value studies would also be needed as a basis for firm financial estimates. Substantial technical activity is thus needed before final approval, even if the main outlines of the problem and its solution are discernible now.

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